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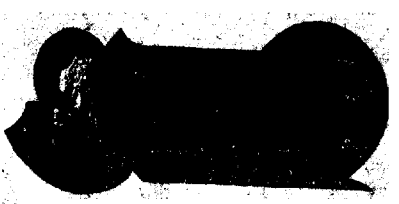

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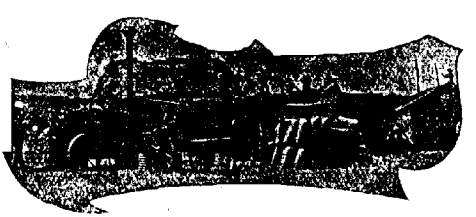

THE JOURNAL

OF

The Department of Agriculture

OF

VICTORIA.

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ARTIFICIAL FERTILIZERS ACT.

Unit Values for 1916.

By P. Rankin Scott, Chemist for Agriculture.

The term fertilizer under this Act means any substance containing nitrogen, phosphoric acid, or potash, manufactured, produced, or prepared in any manner for the purpose of fertilizing the soil or supplying nutriment to plants, but does not include farmyard or stable manure, or any crude night-soil, crude offal, or other unmanufactured refuse.

The Act requires every manufacturer and importer of manures, who desires to have a brand registered in respect of any manure, to make application to the Secretary for Agriculture for the registration of such brand on or before the 1st day of November in each year.

Every such application shall set forth the full name and place of business of the applicant, the name, figure, trade mark, or sign to be attached or associated with the manure to identify it, the raw materials from which the fertilizer is manufactured, and a statement of analysis showing the composition of the manure in respect to the ingredients nitrogen, phosphoric acid, and potash, and the respective forms in which they occur, and the retail price of the manure.. This list shall be published in the *Government Gazette*. No fertilizer shall be sold except in parcels. Every such parcel and every invoice certificate and label used in connexion with such fertilizer shall be marked with a registered brand in such manner as is prescribed.

First, upon the sale of any fertilizer, the vendor shall at the time of sale or before delivery of the same, give to the purchaser an invoice

certificate, signed by the vendor or his agent, stating the name and place of business of the vendor, the figure, trade mark, or other sign attached to or associated with the fertilizer and intended for identifying it.

The quantity of fertilizer comprised in the sale, the proportion per centum in which such fertilizer contains the following ingredients—Nitrogen, phosphoric acid, and potash, and the forms in which they respectively occur must be stated as provided in Second Schedule.

Secondly, every person who sells or offers or exposes for sale any fertilizer, and every dealer in fertilizers who has in his possession any fertilizer, shall securely and conspicuously affix to each parcel thereof a plainly printed label of linen or other suitable material, clearly and truly certifying:—

The number of net pounds of fertilizer in the parcel, the figure, trade mark, or other sign under which the fertilizer is sold, the name and address of the manufacturer or importer, the place of manufacture, and giving a chemical analysis stating the proportion per centum in which the fertilizer contains the three ingredients—nitrogen, phosphoric acid, and potash, and the respective forms in which they respectively occur, as required to be stated in the invoice certificate.

Percentage of deficiency allowed in regard to ingredients of fertilizing value:—

	Nitrogen.	Potash readily soluble.	Phosphoric Acid.		
			Water soluble.	Citrate soluble.	Citrate insoluble.
Fertilizers containing Nitrogen ..	0·50				
Fertilizers containing Potash ..	..	1·00			
*Fertilizers containing Phosphoric Acid	..	..	1·00	1·00	1·00

* Provided that the total phosphoric acid deficiency shall not exceed 1·50 per cent.

The Valuation of Manures from Analysis.

The commercial value of a manure can be found by multiplying the percentage of the nitrogen, phosphoric acid, or potash content of the manure as stated on the label or invoice certificate by the unit value fixed for the ingredient, in the form in which it is guaranteed to be present in the manure. As, for example, in the case of superphosphate:—

			s.	d.	Value per ton.		
Water soluble phosphoric acid	17·0	×	4	10	£4	2	2
Citrate soluble phosphoric acid	0·5	×	4	7	0	2	4
Citrate insoluble phosphoric acid	0·5	×	2	0	0	1	0
Total					£4	5	6

Fertilizers Act 1915.

UNIT VALUES FOR THE YEAR 1916 AS CALCULATED FROM THE DECLARED PRICES OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE.

	s.	*d.*
1 per cent. Nitrogen as Nitrate	18	9
1 per cent. Nitrogen as Ammonia	17	6
1 per cent. Nitrogen as Blood	16	9
1 per cent. Nitrogen as Fine Bone	15	6
1 per cent. Nitrogen as Coarse Bone and Flesh	14	6
1 per cent. Phosphoric Acid as Water Soluble	4	10
1 per cent. Phosphoric Acid as Citrate Insoluble	4	7
1 per cent. Phosphoric Acid as Fine Bone	4	7
1 per cent. Phosphoric Acid as Coarse Bone	3	6
1 per cent. Phosphoric Acid as Citrate Insoluble in High-grade Bone Fertilizer and Super., Bone Fertilizer, and Dried Blood	3	0
1 per cent. Phosphoric Acid as Citrate Insoluble in all other Manures	2	0
1 per cent. Potash as Sulphate	9	7

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652).

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.	Potash.	Price asked for the Manure per ton.	Where Obtainable.
		%	%	%	£ s. d.	
Mainly Nitrogenous.						
Nitrate of Soda	Wischer and Co.	15·50	..	..	14 10 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
,,	Sickle	15·50	..	..	14 10 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,,	M.L.	15·50	..	..	14 10 0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,,	Federal S.N.	15·50	..	..	14 10 0	Australian Explosives and Chemical Co. Ltd. William-street, Melbourne
Sulphate of Ammonia	Wischer and Co.	20·00	..	..	18 0 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
,, ,,	M.G. Co.	20·59	..	..	16 0 0	The Metropolitan Gas Co., Flinders-street, Melbourne
,, ,,	Sickle	20·00	..	..	18 0 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,, ,,	M.L.	20·00	..	..	18 0 0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,, ,,	Federal A.S.	20·00	..	..	18 0 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Blood Manure	Federal	7·50	1·00	..	6 15 0	,, ,, ,,
,,	M.L.	11·00	..	..	10 0 0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,,	M.C.C.	7·50	1·00	0·41	5 5 0	The Melbourne City Council, Town Hall, Melbourne
Dried Blood	Imperial	11·00	..	..	9 0 0	W. Angliss and Co. Prop. Ltd., Bourke-street, Melbourne
Blood Manure	Wischer and Co.	7·50	1·00	..	6 15 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
,,	Sickle	7·50	1·00	..	6 15 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,,	M.L.	7·50	1·00	..	6 15 0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,,	Hasell's	10·25	..	..	8 10 0	Arthur H. Hasell, Queen-street, Melbourne
Mainly Potassic.						
Sulphate of Potash	Hasell's	..	..	52·00	25 0 0	Arthur H. Hasell, Queen-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.	Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.			
Phosphate readily Soluble.		%	%	%	%	%	%	£ s. d.	
Superphosphate ..	Federal O.S.	..	17·00	0·50	0·50	18·00	..	4 7 6	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
,, ...	M.L. No. 1	..	17·00	0·50	0·50	18·00	..	4 7 6	Mr. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
.. .. ..	Cockbill's	..	17·00	1·00	2·00	20·00	..	4 10 0	J. Cockbill, Post Office-place, Melbourne
,, ...	Rohs	..	18·85	1·70	0·45	19·00	..	4 10 0	P. Rohs Prop. Ltd., Bendigo
,, ...	Hasell's	..	17·50	0·50	2·00	20·00	..	4 7 6	Arthur H. Hasell, Queen-street, Melbourne
,, ...	Sickle	..	17·00	0·50	0·50	18·00	..	4 7 6	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,, ...	Wischer and Co. No. 1	..	17·00	0·50	0·50	18·00	..	4 7 6	Wischer and Co. Prop. Ltd., William-street, Melbourne
Concentrated Superphosphate	Wischer and Co. ..	..	40·00	4·00	..	44·00	..	12 10 0	,, ,, ,, ,,
,, ,, ,,	Sickle	..	40·00	4·00	..	44·00	..	12 10 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,, ,, ,,	M.L.	..	40·00	4·00	..	44·00	..	12 10 0	Mr. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,, ,, ,,	Federal Conc. S. ..	..	40·00	4·00	..	44·00	..	12 10 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Phosphatic, moderately Soluble.									
Basic Phosphate ..	Wischer and Co.	..	..	14·00	3·00	17·00	..	4 5 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
,, ,, ..	Sickle	..	..	14·00	3·00	17·00	..	4 5 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,, ,, ..	M.L.	..	..	14·00	3·00	17·00	..	4 5 0	Mr. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
,, ,, ..	Federal B.P. ..	..	..	14·00	3·00	17·00	..	4 5 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.	Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total			
Phosphatic, difficulty Soluble.		%	%	%	%	%	%	£ s. d.	
Ground Phosphate ..	Wischer and Co., 50%	..	..	..	23·00	23·00	..	3 10 0	Wischer and Co. Prop. Ltd., William street, Melbourne
" " ..	Wischer and Co., 80%	..	..	..	36·65	36·65	..	5 0 0	" " " "
" " ..	Sickle, 50% ..	..	..	..	23·00	23·00	..	3 10 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
" " ..	Sickle, 80% ..	..	..	..	36·65	36·65	..	5 0 0	" " " "
" " ..	M.L., 50% ..	..	..	..	23·00	23·00	..	3 10 0	Mc. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
" " ..	M.L., 80% ..	..	..	..	36·65	36·65	..	5 0 0	" " " "
" " ..	Federal C.P., 80% ..	..	..	..	36·65	36·65	..	5 0 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Containing Phosphoric Acid and Nitrogen moderately Soluble.									
Nitro Superphosphate ..	Federal N.S. ..	1·50	12·00	1·25	3·95	17·20	..	5 10 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
" " ..	Wischer and Co. ..	*2·00	12·06	0·38	1·53	14·87	..	5 10 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
" " ..	Sickle	*2·00	13·00	0·30	1·61	15·00	..	5 10 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
" " ..	M.L.	*2·00	13·00	0·38	1·37	14·75	..	5 10 0	Mc. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Dissolved Bones and Superphosphate	Wischer and Co. ..	1·00	10·00	3·63	4·73	18·36	..	5 10 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
" " ..	Sickle	1·00	10·00	3·63	4·73	18·36	..	5 10 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
" " ..	M.L.	1·00	10·00	3·45	4·37	17·82	..	5 10 0	Mc. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
HIGH GRADE.									
Bone Manure and Superphosphate	Cockbill's No. 1 ..	1·75	12·00	2·80	1·50	18·50	..	5 10 0	J. Cockbill, Post Office-place, Melbourne
Blood and Bone Fertilizer and Superphosphate	Federal B.B.S. ..	2·50	8·50	1·75	6·25	16·50	..	6 5 0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
" " "	M.L.	2·50	8·50	1·75	6·25	16·50	..	6 5 0	Mc. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
" " "	Sickle (B) ..	2·50	8·50	1·75	6·25	16·50	..	6 5 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
" " ..	Wischer and Co. ..	2·50	8·50	1·75	6·25	16·50	..	6 5 0	Wischer and Co. Prop. Ltd., William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.			Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.		£	s.	d.	
		%	%	%	%	%	%				
LOW GRADE.											
Bone Manure and Superphosphate	Cockbill's No. 2 ..	0·90	14·45	1·60	5·20	19·25	..	5	5	0	J. Cockbill, Post Office-place, Melbourne
Bone and Superphosphate	Hasell's B. ..	0·80	12·75	1·75	4·75	19·25	..	5	4	0	Arthur H. Hasell, Queen-street, Melb.
Bone Fertilizer and Superphosphate (143)	Federal B.S. No. 3	0·75	12·75	1·13	3·62	17·50	..	5	5	0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Bone Fertilizer and Superphosphate	M.L. No. 1 ..	1·50	8·50	3·25	5·25	17·00	..	5	12	6	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Bone and Superphosphate	Hasell's A. ..	1·50	8·50	3·00	7·00	18·50	..	5	11	6	Arthur H. Hasell, Queen-street, Melb.
Bone Fertilizer and Superphosphate	Federal B.S. No. 1	1·50	8·50	1·75	6·75	17·00	..	5	12	6	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
" " "	M.L. No. 2 ..	0·75	12·75	1·38	3·37	17·50	..	5	5	0	Mt. Lyell M. and R. Co. Ltd., Collins-street, Melbourne
Bone and Superphosphate	Gardiner's ..	1·25	8·00	3·20	5·80	17·00	..	5	5	0	Geo. Gardiner and Co. Prop. Ltd., Marshalltown
Bone Fertilizer and Superphosphate	Sickle (C.) ..	0·75	12·75	1·37	3·38	17·50	..	5	5	0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
" " "	Sickle (A.) ..	1·50	8·50	3·25	5·25	17·00	..	5	12	6	" " "
A.N.A. Surprise Animal Fertilizer and Superphosphate	A.N.A. Surprise ..	1·50	7·50	2·00	7·00	16·50	..	5	15	0	G. W. Pennell, Braybrook
Bone Dust and Superphosphate	Rohs	1·50	9·00	2·25	5·75	17·00	..	5	12	6	P. Rohs Prop. Ltd., Bendigo
Bone Fertilizer and Superphosphate	Wischer and Co. No. 2	0·75	12·75	1·37	3·38	17·50	..	5	5	0	Wischer and Co. Prop. Ltd., William-street, Melbourne
" " "	Wischer and Co. No. 1	1·50	8·50	3·25	5·25	17·00	..	5	12	6	" " " "
Containing Nitrogen and Phosphoric Acid; Nitrogen moderately Soluble, Phosphoric Acid difficultly Soluble.											
Blood and Bone Fertilizer	Federal B. and B.F.	5·00	..	3·00	12·00	15·00	..	7	0	0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
" " "	Wischer and Co. ..	5·00	..	3·00	12·00	15·00	..	7	0	0	Wischer and Co. Prop. Ltd., William-street, Melbourne
" " "	Sickle	5·00	..	3·00	12·00	15·00	..	7	0	0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
Bone and Blood ..	Hasell's No. 1 ..	6·75	..	5·55	4·00	9·55	..	7	2	6	Arthur H. Hasell, Queen-street, Melb.
Blood and Bone Fertilizer	M.L. (A.) ..	5·00	..	3·00	12·00	15·00	..	7	0	0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.	Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.			
		%	%	%	%	%	%	£ s. d.	
Containing Nitrogen and Phosphoric Acid moderately Soluble.									
HIGH GRADE.									
Bone Fertilizer ..	Ark	4·06	..	5·69	11·16	16·85	..	6 0 0	Arthur Murphy, Ararat
Bone Manure	Cockbill's ..	6·00	..	5·00	10·00	15·00	..	7 0 0	J. Cockbill, Post Office-place, Melbourne
Fertilizer	Special Magic ..	5·00	..	3·00	10·00	13·00	..	6 10 0	Geo. Gardiner and Co. Prop. Ltd., Marshalltown
Containing Nitrogen and Phosphoric Acid difficulty Soluble.									
LOW GRADE.									
Bone Fertilizer	Cockbill's ..	3·50	..	3·50	14·75	18·25	..	5 10 0	J. Cockbill, Post Office-place, Melbourne
" "	Federal B.F. ..	3·00	..	3·00	13·00	16·00	..	6 2 6	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
" "	M.L. (B.) ..	3·00	..	3·00	13·00	16·00	..	6 2 6	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Fertilizer	Magic No. 2 ..	1·50	..	3·00	13·00	16·00	..	5 0 0	George Gardiner and Co. Prop. Ltd., Marshalltown
"	Magic No. 1 ..	2·00	..	3·00	14·00	17·00	..	5 5 0	" " "
Bone Fertilizer	Sickle	3·00	..	3·00	13·00	16·00	..	6 2 6	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
Animal Fertilizer ..	A.N.A. Surprise ..	3·00	..	4·00	12·00	16·00	..	6 5 0	G. W. Pennell, Braybrook
Bone Fertilizer ..	Wischer and Co. ..	5·00	..	3·00	13·00	16·00	..	6 2 6	Wischer and Co. Prop. Ltd., William-street, Melbourne

* Containing 1·50 % Nitrogen as Ammonium Sulphate.

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.	Mechanical Condition.		Price asked for the Manure per ton.	Where Obtainable.
				Fine.	Coarse.		
Containing Nitrogen and Phosphoric Acid soluble and reverted by Soluble. HIGH GRADE.		%	%	%	%	£ s. d.	
Bonemeal	Wischer and Co. ..	3·00	19·00	30·00	70·00	7 0 0	Wischer and Co. Prop. Ltd., William-street, Melbourne
Bonedust	Ox	3·15	22·00	33·00	67·00	6 0 0	Executors of Thos. Brown, Hamilton
,, ...	Robs	4·00	18·00	55·00	45·00	6 2 6	P. Robs Prop. Ltd., Bendigo
Bonemeal	Sickle	3·00	19·00	30·00	70·00	7 0 0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
,, ...	M.L.	3·00	19·00	30·00	70·00	7 0 0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Bonedust	Brown Hill ..	2·50	18·00	30·00	70·00	6 0 0	Alfred A. Turner, Ballarat East
,, ...	Marvell	3·74	23·62	36·00	64·00	6 10 0	Spriggs and Perrier, Benalla
,, ...	Vaux Hall ..	3·86	23·25	33·70	66·30	6 15 0	William Moore, Panmure
,, ...	Lion	3·83	21·50	31·00	69·00	6 10 0	Alfred Wray, Sale

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.			Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.		£	s.	d.	
Containing Nitrogen, Phosphoric Acid, and Potash.		%	%	%	%	%	%				
Horticultural Manure ..	M.L.	*1·50	11·00	0·42	0·49	11·91	3·00	9	0	0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Potato (with Bone) Manure	.. .. ..	1·65	8·50	0·25	6·55	15·30	2·50	7	0	0	.. ..
.. Manure ..	.. .. ..	†1·40	14·50	0·58	0·42	15·50	2·00	6	7	6	.. ..
.. .. ..	Wischer and Co. ..	†1·33	14·62	0·43	0·43	15·48	2·00	6	7	6	Wischer and Co. Prop. Ltd., William-street, Melbourne
.. (with Bone) Manure	.. .. ..	1·35	8·50	1·60	6·10	16·20	2·50	7	0	0	.. ..
Horticultural Manure ..	.. .. ..	*1·50	11·26	0·33	0·33	11·92	3·00	9	0	0	.. ..
Orchard Manure ..	.. .. ..	†2·58	12·05	0·38	0·38	13·72	3·00	7	7	6	.. ..
Potato Manure ..	Sickle (A) ..	1·55	8·00	2·90	5·28	16·18	2·50	7	0	0	Cunaing, Smith, and Co. Prop. Ltd., William-street, Melbourne
.. .. ..	.. (B) ..	†1·40	14·62	0·43	0·43	15·48	2·00	6	7	6	.. ..
Orchard Manure ..	.. .. ..	†2·40	12·92	0·38	0·38	13·68	3·00	7	7	6	.. ..
Horticultural Manure ..	.. .. ..	*1·50	11·22	0·33	0·33	11·88	3·00	9	0	0	.. ..
Orchard Manure ..	M.L.	†2·65	13·00	0·37	0·38	13·75	3·00	7	7	6	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Horticultural Manure ..	Federal H.M. ..	*1·50	11·20	0·33	0·33	11·86	3·00	9	0	0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Orchard Manure ..	Federal F.M. ..	*2·20	13·22	0·39	0·39	14·00	3·00	7	7	6	.. ..
Potato Manure	Federal Potato ..	*1·50	14·00	0·47	0·41	14·82	2·00	6	7	6	.. ..
Containing Nitrogen and Phosphoric Acid only.											
Grass-laying Manure ..	Federal G.L. ..	0·90	11·00	0·86	5·48	17·34	..	5	5	0	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne
Pea, Bean, and Clover Manure	Federal P.B. ..	*0·50	14·50	0·43	0·43	15·36	..	5	5	0	.. ..
Topdressing for Grass Manure	Federal T.D. ..	*0·85	16·00	0·47	0·47	16·94	..	5	5	0	.. ..
Rape Manure	Federal Rape ..	*2·00	13·00	0·38	0·88	14·26	..	5	10	0	.. ..
Onion Manure	Federal M.G. ..	*2·50	12·80	0·38	0·38	13·56	..	6	7	6	.. ..
Barley Manure	M.L.	†1·00	15·00	0·50	0·50	16·00	..	5	10	0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Citrus, No. 2, Mildura, Manure	.. .. ..	2·02	5·54	0·16	10·95	16·65	..	5	17	6	.. ..
Apricot and Peach, No. 2, Mildura, Manure	.. .. ..	*5·75	12·11	0·35	0·36	12·82	..	8	10	0	.. ..
Vine, No. 4, Mildura, Manure	.. .. ..	*0·20	9·18	0·27	0·27	9·72	..	10	17	6	.. ..

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915—*continued.*

Description of Manure.	Brand.	Nitrogen.	Phosphoric Acid.				Potash.	Price asked for the Manure per ton.			Where Obtainable.
			Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.		£	s.	d.	
Containing Nitrogen, Phosphoric Acid, and Potash.		%	%	%	%	%	%				
Leguminous Manure ..	M.L.	0·25	15·30	0·55	0·55	16·40	..	5	5	0	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Vine, No. 2, Mildura, Manure	.. .. ..	‡7·13	9·18	0·27	0·27	9·72	..	9	7	6	.. ..
Grass Manure, Topdressing	Sickle	*0·77	16·15	0·17	0·48	17·10	..	5	5	0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
Grass Manure	.. .. ..	0·55	11·05	0·32	7·88	19·25	..	5	5	0	.. ..
Maize Manure	.. .. ..	‡2·35	14·62	0·43	0·43	15·48	..	6	7	6	.. ..
Onion Manure	.. .. ..	‡2·30	13·60	0·40	0·40	14·40	..	6	7	6	.. ..
Rape Manure	.. .. ..	‡2·00	13·00	0·39	1·61	15·00	..	5	10	0	.. ..
Key Fertilizer (Grass) ..	Wischer and Co. ..	†0·75	15·50	0·15	0·45	16·20	..	5	5	0	Wischer and Co. Prop. Ltd., William-street, Melbourne
Grass Manure	.. .. ..	†·00	11·47	1·09	3·59	16·15	..	5	5	0	.. ..
Rape Manure	.. .. ..	†1·31	15·09	0·44	0·44	15·97	..	5	10	0	.. ..
Leguminous Manure ..	.. .. ..	0·25	15·30	0·45	0·45	16·20	..	5	5	0	.. ..
Onion Manure	.. .. ..	‡2·38	12·75	0·38	0·37	13·50	..	6	7	6	.. ..
Maize Manure	.. .. ..	‡2·00	13·66	0·43	0·43	15·52	..	6	7	6	.. ..
Onion Manure	M.L.	‡3·25	10·55	0·31	1·12	11·78	..	6	7	6	Mt. Lyell M. and R. Co. Ltd., Little Collins-street, Melbourne
Rape Manure	.. .. ..	†1·10	15·00	0·55	1·15	16·70	..	5	10	0	.. ..
Laying Down Grass Manure	.. .. ..	0·52	11·05	0·33	8·08	19·46	..	5	5	0	.. ..
Topdressing Grass or Lawn Manure	.. .. ..	0·98	12·00	3·12	0·36	15·48	..	5	5	0	.. ..
Maize and Fodder Crop Manure	.. .. ..	§3·10	11·84	0·35	1·42	13·61	..	6	7	6	.. ..
Leguminous Manure ..	Sickle	0·25	15·30	0·55	0·55	16·40	..	5	5	0	Cuming, Smith, and Co. Prop. Ltd., William-street, Melbourne
Mildura, Vine, No. 2, Manure	.. .. ..	‡7·13	9·18	0·27	0·27	9·72	..	9	7	6	.. ..
Mildura, A. and P., No. 2, Manure	.. .. ..	‡4·45	12·11	0·35	0·36	12·82	..	7	12	6	.. ..
Mildura, Vine, No. 4, Manure	.. .. ..	*9·20	9·18	6·27	0·27	9·72	..	10	17	6	.. ..
Mildura, Citrus, No. 2, Manure	.. .. ..	2·02	5·52	0·16	10·96	16·64	..	5	17	6	.. ..
Maize Manure	Federal M.Z. ..	†7·00	11·20	0·93	2·73	14·86	..	6	7	6	Australian Explosives and Chemical Co. Ltd., William-street, Melbourne

* Containing Nitrogen as Ammonium Sulphate.
‡ Containing Nitrogen as Nitrate of Soda.
† Containing Nitrogen mainly as Ammonium Sulphate.
§ Containing Nitrogen as Ammonia, Nitrate, and Organic.

P. RANKIN SCOTT,
Chemist for Agriculture.

Melbourne, 3rd December, 1915.

Fertilizers Act 1915.

LIST SHOWING RESULTS OF ANALYSIS OF SAMPLES OF ARTIFICIAL MANURES COLLECTED IN VICTORIA UNDER THE PROVISIONS OF SECTION 27 OF THE FERTILIZERS ACT 1915 (6 GEO. V. No. 2652).

Label No.	Description of Manure.	Manufacturer or Importer.	Nitrogen.		Phosphoric Acid.								Price asked for the Manure per ton.	District in which Sample was obtained.
			Moisture.	Found.	Guaranteed.	Water Soluble.		Citrate Soluble.		Citrate Insoluble.		Total.		
						Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	
			%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
901	"Hasell's" Bone and Superphosphate (½ and ½)	A. H. Hasell ..	5·14	1·05	0·80	12·09	12·75	1·62	1·00	5·68	5·50	19·39	19·25	5 4 0	Metropolitan
902	" " " " ..	" " ..	4·21	0·50	0·80	13·30	12·75	2·35	1·00	3·95	5·50	19·60	19·25	5 4 0	"
1247	"Wischer's" No. 1 Superphosphate	Wischer and Co. ..	9·70	..	..	17·29	17·00	0·74	1·00	1·52	2·00	19·55	20·00	4 7 6	"
1248	"Sickle" Florida Superphosphate	Cuming, Smith, and Co.	9·77	..	..	17·17	17·00	1·15	1·00	1·92	2·00	20·54	20·00	4 7 6	"
1249	"Hasell's Bone and Superphosphate (½ and ½)	A. H. Hasell ..	5·25	1·92	1·50	8·28	8·50	2·81	0·50	5·45	9·50	16·54	18·50	5 11 6	"
1250	"Sickle" Bone and Superphosphate Mixed (A)	Cuming, Smith, and Co.	9·33	1·30	1·50	12·01	8·50	1·57	8·50	4·34	0·00	18·82	18·00	5 12 6	"
1251	"Mt. Lyell" No. 1 Superphosphate	Mt. Lyell M. and R. Co.	8·54	..	..	17·12	17·00	0·86	1·00	1·67	2·00	19·65	20·00	4 7 6	"
1252	"Wischer's" No. 1 Superphosphate	Wischer and Co. ..	9·92	..	..	17·29	17·00	1·54	1·00	1·36	2·00	20·19	20·00	4 7 6	"
1253	"Mt. Lyell" No. 1 Superphosphate	Mt. Lyell M. and R. Co.	7·50	..	..	16·23	17·00	0·70	1·00	2·13	2·00	19·06	20·00	4 7 6	"
1254	"Mt. Lyell" No. 1 Bone Fertilizer and Superphosphate	" " "	6·15	1·78	1·50	7·85	8·50	5·20	3·50	4·77	6·00	17·82	18·00	5 12 6	"
1255	"Sickle" Florida Superphosphate	Cuming, Smith, and Co.	9·57	..	..	17·41	17·00	1·55	1·00	1·40	2·00	20·36	20·00	4 7 6	"
1256	"Hasell's" Superphosphate	A. H. Hasell ..	8·86	..	..	16·81	17·50	1·25	0·50	1·88	2·00	19·94	20·00	4 7 6	"
1257	"Wischer's" No. 1 Superphosphate	Wischer and Co. ..	9·15	..	..	16·67	17·00	0·55	1·00	1·96	2·00	19·18	20·00	4 7 6	"
1258	" " "	" " ..	9·17	..	..	16·67	17·00	0·70	1·00	2·04	2·00	19·31	20·00	4 7 6	"
1259	"Sickle" Florida Superphosphate	Cuming, Smith, and Co.	10·47	..	..	17·17	17·00	1·00	1·00	2·31	2·00	20·48	20·00	4 7 6	"
1260	"Sickle" Dissolved Bone and Superphosphate	" " "	9·26	0·93	1·00	14·06	10·01	1·48	3·88	5·05	5·48	20·59	19·37	5 10 0	"
1261	"Mt. Lyell" No. 1 Superphosphate	Mt. Lyell M. and R. Co.	9·32	..	..	17·28	17·00	0·90	1·00	2·05	2·00	20·23	20·00	4 7 6	"
1262	" " "	" " "	7·66	..	..	17·49	17·00	0·77	1·00	2·07	2·00	20·33	20·00	4 7 6	"

LIST SHOWING RESULTS OF ANALYSIS OF SAMPLES OF ARTIFICIAL MANURES COLLECTED IN VICTORIA UNDER THE PROVISIONS OF SECTION 27 OF THE FERTILIZERS ACT 1915 (6 GEO. V. NO. 2652)—*continued.*

Label No.	Description of Manure.	Manufacturer or Importer.	Moisture	Nitrogen.		Phosphoric Acid.								Price asked for the Manure per ton.			District in which Sample was obtained.
						Water Soluble.		Citrate Soluble		Citrate Insoluble		Total.					
				Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.				
			%	%	%	%	%	%	%	%	%	%	%	£	*s.*	*d.*	
1265	"Wischer's" No. 1 Superphosphate	Wischer and Co. ..	7·01	..	..	17·14	17·00	1·18	1·00	1·98	2·00	20·30	20·00	4	7	6	Warracknabeal
1266	"Sickle" Florida Superphosphate	Cuming, Smith, and Co.	10·26	..	..	16·58	17·00	1·71	1·00	1·58	2·00	19·87	20·00	4	7	6	,,
1267	"Elsworth's" Bone Fertilizer	J. R. Elsworth ..	7·04	3·64	2·50	..	..	7·52	6·00	13·15	11·00	20·67	17·00	5	15	0	Ballarat
1268	"Sickle" Bone Fertilizer	Cuming, Smith, and Co.	5·27	3·25	3·00	..	..	6·56	3·00	11·03	13·00	17·56	16·00	6	2	6	Beaufort
1269	"Hasell's" Superphosphate	A. H. Hasell ..	6·20	..	..	18·19	17·50	1·09	0·50	1·01	2·00	21·19	20·00	4	7	6	Warracknabeal
1271	"Sickle" Blood, Bone Fertilizer and Superphosphate Mixed (B)	Cuming, Smith, and Co.	7·52	2·66	2·50	8·53	8·50	6·65	2·00	4·27	7·00	19·45	17·50	6	5	0	Ararat
1272	"Hasell's" Superphosphate	A. H. Hasell ..	1·99	..	..	18·73	17·50	1·14	0·50	1·52	2·00	21·39	20·00	4	7	6	Murtoa
1274	"Ark" Bone Fertilizer ..	A. Murphy ..	7·89	4·06	3·72	..	..	5·69	3·98	11·16	12·90	16·85	16·88	6	0	0	Ararat
1275	"Mt. Lyell" No. 1 Superphosphate	Mt. Lyell Mining and R. Co.	6·06	..	..	16·51	17·00	1·15	1·00	1·67	2·00	19·33	20·00	4	7	6	Horsham
1276	,, ,, ,,	,, ,, ,,	7·73	..	..	18·12	17·00	1·08	1·00	1·91	2·00	21·11	20·00	4	7	6	Murtoa
1277	"Sickle" Bone Fertilizer and Superphosphate Mixed (A)	Cuming, Smith, and Co.	8·17	3·22	1·50	11·32	8·50	1·25	3·50	6·63	6·00	19·20	18·00	5	12	6	Ballarat
1278	"Hasell's" Superphosphate	A. H. Hasell ..	6·68	..	..	18·36	17·50	1·11	0·50	1·27	2·00	20·74	20·00	4	7	6	Horsham
1279	"Wischer's" No. 1 Superphosphate	Wischer and Co. ..	7·90	..	..	16·39	17·00	1·03	1·00	3·10	2·00	20·22	20·00	4	7	6	,,
1280	"Sickle" Bone Fertilizer	Cuming, Smith, and Co.	6·63	3·21	3·00	..	..	6·84	3·00	12·19	13·00	19·03	16·00	6	2	6	Ballarat
1281	"Federal" Superphosphate O.S.	Australian Explosives and Chemical Co.	7·84	..	..	18·19	17·00	0·79	1·00	1·05	2·00	20·03	20·00	4	7	6	Stawell
1282	"Federal" Bone Fertilizer and Superphosphate (E.S. No. 1)	Australian Explosives and Chemical Co.	3·69	1·39	1·50	11·29	8·50	4·02	3·50	4·40	6·00	19·71	18·00	5	12	6	,,
1283	"A.N.A. Surprise" Animal Fertilizer	G. W. Pennell ..	8·10	3·35	3·00	..	..	7·14	4·00	13·00	12·00	20·14	16·00	6	0	0	Metropolitan

LIST SHOWING RESULTS OF ANALYSIS OF SAMPLES OF ARTIFICIAL MANURES COLLECTED IN VICTORIA UNDER THE PROVISIONS OF SECTION 27 OF THE FERTILIZERS ACT 1915 (6 GEO. V. NO. 2652)—*continued.*

Label No.	Description of Manure.	Manufacturer or Importer.	Nitrogen.			Phosphoric Acid.								Price asked for the Manure per ton.			District in which Sample was obtained.
			Moisture.	Found.	Guaranteed.	Water Soluble.		Citrate Soluble.		Citrate Insoluble.		Total.					
						Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	£	s.	d.	
			%	%	%	%	%	%	%	%	%	%	%				
1284	"Sickle" Florida Superphosphate	Cuming, Smith, and Co.	7·40	..	..	16·85	17·00	0·90	1·00	2·00	2·00	19·75	20·00	4	7	6	Metropolitan
1285	"Mt. Lyell" Blood and Bone Fertilizer (A)	Mt. Lyell M. and R. Co.	7·44	4·97	5·00	..	..	8·35	3·00	10·34	12·00	18·69	15·00	7	0	0	,,
1286	"Mt. Lyell" No. 1 Bone Fertilizer and Superphosphate	,, ,, ,,	7·30	1·46	1·50	8·98	8·50	6·64	3·50	2·64	6·00	18·26	18·00	5	12	6	,,
1287	"Mt. Lyell" Blood and Bone Fertilizer (A)	,, ,, ,,	7·31	5·31	5·00	..	..	6·97	3·00	9·54	12·00	16·51	15·00	7	0	0	Cheltenham
1288	"Sickle" Nitro-Superphosphate	Cuming, Smith, and Co.	9·40	2·66*	2·00	14·48	13·00	1·42	0·76	1·96	2·52	17·86	16·28	5	10	0	,,
1290	Bone Fertilizer	J. Cockbill	7·99	3·69	3·50	..	..	6·45	3·50	12·45	14·75	18·90	18·75	5	10	0	Moorabbin
1291	"Champion" Animal Fertilizer	J. Cooke and Co. ..	4·90	0·41	6·50	..	..	5·07	4·59	4·81	5·00	9·88	9·50	6	0	0	,,
1292	Bone Fertilizer	J. Cockbill	7·22	3·10	3·50	..	..	5·64	3·50	14·12	14·75	19·76	18·75	5	10	0	Ringwood
1293	"Sickle" Bone Fertilizer..	Cuming, Smith, and Co.	8·16	3·48	3·00	..	..	10·95	3·00	8·04	13·00	19·89	16·00	6	2	6	,,
1295	,, ,, ,, ..	,, ,, ,,	7·24	2·09	3·00	..	..	9·60	3·00	9·77	13·00	19·37	16·00	6	2	6	Bayswater
1296	,, ,, ,, ..	,, ,, ,,	7·24	2·09	3·00	..	..	8·96	3·00	7·39	12·00	16·35	15·00	7	0	0	Burwood
1297	"Mt. Lyell" Blood and Bone Fertilizer (A)	Mt. Lyell M. and R. Co.	8·40	5·47	5·00	..	..	8·96	3·00	9·76	13·00	17·13	16·00	6	2	6	,,
1298	"Mt. Lyell" Bone Fertilizer (B)	,, ,, ,,	8·06	3·28	3·00	..	..	7·37	3·00	9·76	13·00	17·13	16·00	6	2	6	,,
1294	"Mt. Lyell" Onion Manure‡	,, ,, ,,	8·50	3·10†	3·00	10·79	10·35	1·86	0·61	2·13	2·04	14·78	13·00	6	7	6	Dandenong

* Containing 1·95 per cent. nitrogen as ammonia, and 0·71 per cent. organic nitrogen.
† Containing 1·22 per cent. nitrogen as ammonia, and 1·88 per cent. organic nitrogen.
‡ Guaranteed to contain 3 per cent. potash found to contain 2·91 per cent. potash.

Department of Agriculture,
Melbourne, 19th November, 1915.

P. RANKIN SCOTT,
Chemist for Agriculture.

INSPECTION UNDER THE ARTIFICIAL FERTILIZERS ACT.

Season 1914–15.

By P. R. Scott, Chemist for Agriculture, and W. C. Robertson, Supervising Analyst.

Owing to resignations from the staff and important special work carried out in the Laboratory during the past year, the usual thorough method of inspecting artificial manure stocks and consignments could not be undertaken.

However, during the course of the year approximately 50 samples of the various manures on the market were collected. The majority were obtained at the consigning station in the metropolis, but as a safeguard one or two flying visits were made to the country and samples taken *en route*.

In addition, numerous consignments were weighed when being consigned, and it is satisfactory to report that in every instance the guaranteed net weight was exceeded.

In one or two cases technical breaches were observed, and a note of warning despatched to the offender. Whilst technical offences of the Act are, speaking generally, lightly regarded by merchant, agent, and farmer, it should be remembered that they offer loopholes for the practice of fraud.

As an instance one particular case is cited. A consignment of artificial manure was noticed, each and every bag of which had a label affixed as required by the Act. A closer inspection of the labels, however, disclosed the fact that the net weight in pounds had been altered, the printed number being deleted and a pencil number substituted.

Alterations to the label cannot be permitted, simply because it opens up an avenue for fraud.

The samples collected comprise mainly "Superphosphates," "Bone Fertilizer and Super.," and "Bone Fertilizers"; but, in addition, samples of "Dissolved Bones and Super.," "Blood, Bone, and Super. mixed," "Nitro-Superphosphate," "Animal Fertilizer," "Blood and Bone Fertilizer," and "Onion Manure" were obtained.

In not one single instance did the analysis of these samples disclose any necessity to institute proceedings.

The following is a comparison of the average analytical result of the collected samples against the average guaranteed analysis, together with the comparative average value calculated on the season's unit values.

SUPERPHOSPHATES.

Average Guarantee.				Average Analysis of Collected Samples.			
Phosphoric Acid.				Phosphoric Acid.			
Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.	Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.
17·10	—·91	2·00	20·01	17·25	1·04	1·83	20·12

The average price paid for the manure per ton was **£4 7**s. **6**d., the average value of the samples collected was found to be **£4 7**s. **3**d., and the average value calculated on the average guarantee **£4 6**s. **5**d.

"BONE FERTILIZER AND SUPERS."

—	Nitrogen.	Phosphoric Acid.			
		Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.
Average guarantee ..	1·33	9.56	2·50	6·31	18·37
Average analysis of collected samples	1·58	10·76	3·18	4·73	18.67

The average price paid for the manure per ton was **£5 10**s. **3**d., the average value of the collected samples **£4 19**s. **10**d., and the average guaranteed value **£4 12**s. **6**d.

BONE FERTILIZERS.

—	Nitrogen.	Phosphoric Acid.		
		Citrate Soluble.	Citrate Insoluble.	Total.
Average guarantee ..	3·13	3·55	13·15	16·70
Average analysis of samples collected	3·42	7·40	11·39	18·79

The average price paid per ton was **£5 18**s. **7**d., the average value of samples collected was found to be **£5 8**s., and the average value, calculated on the average guarantee, **£4 15**s. **9**d.

Only one sample of "Dissolved Bone and Super." was collected. The price charged was **£5 10**s. per ton, the value calculated on the analysis of the sample was **£4 15**s. **1**d., and the value according to the guarantee **£4 9**s. **4**d.

The single sample of "Nitro-Super.," sold at **£5 10**s. per ton, was valued at **£4 17**s. **7**d., whilst the calculated value on the result of the analysis was found to be **£5 15**s. **10**d. per ton.

Three samples of "Blood and Bone Fertilizer" were sold at the average price of **£7** per ton, the guaranteed value was **£6 11**s., whilst the average actual value (average analysis of collected samples) was **£7 4**s. **11**d.

In the single case of a complete or special fertilizer, viz., onion manure, the price charged per ton was £6 7s. 6d., the guaranteed value £5 10s. 2d., and the actual value calculated from the result of the analysis £5 19s. 4d.

The farmer should remember that the annual unit values are not based on the agricultural value of the different fertilizers. The unit values are distinctly and decidedly commercial, and they may be controlled by the manufacturers.

The Artificial Manures Act gives the procedure for calculating the unit values, and briefly it is as follows:—The Chemist for Agriculture, from the manufacturer's guarantee and declared prices as set out in the

annual registrations, computes, from the simple manures only, the average unit value of each constituent having a commercial value.

Whilst the present system has many disadvantages, the figures obtained from the samples of fertilizers collected this year are of more than ordinary interest.

Taking the case of the simple manure Superphosphate, it will be noticed that not only does the average guarantee and average analysis coincide almost exactly, but the difference between the price charged for the manure per ton and the average value computed from both guarantee and analysis result is only a matter of 1s.—that is to say, the farmer on an average has received full commercial value.

The maximum value calculated on analysis result was £4 13s. 10d., whilst the minimum was £4 1s. 9d. per ton.

Turning to the figures given under "Bone and Supers." we find a different story, for, whilst the average analysis compares more than favorably with the average guarantee, there is a marked difference in the commercial value. Commercially the average "Bone and Super." was valued at £4 19s. 10d., and whilst being guaranteed to be worth £4 12s. 6d., the price charged per ton was £5 10s. 3d. These figures mean that the farmer paid 10s. 5d. per ton for the labour entailed in mixing the two manures, viz., Bone Fertilizer and "Super." to produce "Bone and Super."

Again, in the case of "Bone Fertilizers," incorrectly termed the "Bonedust Substitute," we find the average guarantee much below the average analysis as found in collected samples, and yet the actual commercial value of the samples was found to be £5 8s. per ton, whilst the average price charged was £5 18s. 7d., and the guaranteed value £4 15s. 9d.

In the case of "Nitro Super." and "Blood and Bone Fertilizers," it will be observed that the farmer came out with a credit balance of some 5s., whereas the samples of "Dissolved Bone and Super." and "Onion" manure show a commercial loss of from 8s. to 15s.

Summed up briefly, this year's figures advise farmers to buy Superphosphate, Blood and Bone Fertilizer, and Nitro-Superphosphate; but, as the commercial value is subject to alteration from year to year, no hard-and-fast rule can be laid down.

It follows that the farmer, in asking to be supplied with "mixed" or "special" fertilizers, is fully aware of the extra trouble and labour entailed in their preparation, and consequently knows full well that he will have to pay for it.

Taking Bone Fertilizer and Superphosphate mixed in the proportion of 1 : 1 ($\frac{1}{2}$ and $\frac{1}{2}$), if the farmer buys the manures singly and mixes them himself, he will save 7s. 6d. per ton. This is the price charged for the labour of mixing.

In the case of "Complete" and "Special" Fertilizers, this figure is considerably higher.

A word on the practice of manuring with mixed manures. No experiments have as yet been undertaken by the Agricultural Department in the matter of manuring with these manures, and, taking the potato or onion crop as an example, it is a moot point as to whether the potato and onion manures on the market will produce any additional profit over and above that produced by the simple manure superphosphate

alone. The outcome of appreciable dressings of Potash or Nitrogen fertilizers, or both in conjunction with the usual dressing of superphosphate, is a horse of another colour.

Taking into consideration the fact that the simple manures as a general rule analyze well, both as regards fertilizing constituents and value, the farmer is well advised who orders simple manures only, and compounds these on the farm as occasion demands.

FARMERS' FIELD DAY.

RUTHERGLEN EXPERIMENTAL FARM.

19th November, 1915.

(Abridged from the *Rutherglen Sun.*)

The Department of Agriculture should feel proud at the unqualified success of the 1915 field day at the Rutherglen Experimental Farm (Viticultural College), on Friday, 19th November. Looked at in every way, it was just what one would desire for such a gathering. The weather was ideal; the attendance surpassed all expectations; the staff had everything ready; the season was favorable; the crops looked well, some exceptionally well, and this gave the demonstrator the best of opportunities to give the farmers a great object lesson, by explaining the different periods at which the different blocks were sown, and the different conditions that existed, thus demonstrating clearly how mistakes may be avoided.

There were fully 500 people present, the great majority of whom were farmers, and interested in cereal growing. It was not a gathering of local growers only; farmers were present from Albury, Howlong, Balldale, and Corowa (N.S.W.), Rutherglen, Chiltern, Barnawartha, Wodonga, Springhurst, Wangaratta, Taminick, Boorhaman, Xorong, Yarrawonga, and Gooramadda districts.

Proceedings were timed to commence at 1.45, but the visitors began to assemble long before that hour; and when Hon. J. Bowser, M.L.A., announced that the Minister of Agriculture, Mr. Hagelthorn, had been detained in Melbourne, owing to his presence being required at a meeting of the Wheat Harvesting Committee, there must have been fully 400 present. Among the visitors were Dr. Cherry, Professor of Agriculture; Mr. P. J. Moloney, M.H.R.; Hon. J. Bowser, M.L.A.; Mr. Temple Smith, Chief Field Officer; three representatives of the Melbourne weekly papers, and leading district residents. The visitors were received by Mr. A. E. V. Richardson, Agricultural Superintendent; Mr. G. H. Adcock, Principal of the Viticultural Station; and Mr. G. Harmer, Farm Manager. After the arrival of the party from Melbourne, no time was lost.

Welcome to Visitors.

Hon. J. Bowser stated that, in the absence of the Minister, he had great pleasure in extending a hearty welcome, on behalf of the Agricultural Department, to all present. He regretted that the Minister for

Agriculture, Mr. Hagelthorn, had been unavoidably detained at a meeting of the Wheat Conference. It had been the Minister's intention to have been present and explain what had been done in reference to the handling of wheat during the present season. The Minister would have been delighted to have met so many residents of the district. It was a big question that the Minister was detained on, and he (Mr. Bowser) trusted that the deliberations of the conference would be to the general benefit of the producer. He had pleasure in calling upon Mr. Richardson, Agricultural Superintendent, to explain the programme of inspection.

Mr. A. E. V. Richardson, Agricultural Superintendent, stated that he had pleasure in welcoming the visitors on behalf of the Department of Agriculture. This was the third annual field day held at the farm, and the attendance showed that a big interest was being taken in the work. Since the last field day, two rainfall records had been established. 1914 was absolutely the driest season ever recorded—only 4½ inches of rain

Portion of Crowd assembling at Woolshed on Field Day, Rutherglen State Farm.

fell in the growing period. This year was absolutely the wettest winter experienced at Rutherglen, as no less than 17½ inches had fallen in the winter months. In one season the crops are starved for want of water; in another they are flooded out. He thought that those who were present two years ago would see that many changes had taken place. Since the last gathering 580 acres of land had been cleared, and at present 860 acres of the 1,100 held by the College were now under cultivation. During the same period 8 miles of fencing had been erected, sheep-yards and woolshed built, and water storage and dams have been provided in each paddock. During the present season 624 acres were sown, consisting of 410 acres of seed wheat, 116 acres of oats, 47 acres of barley, 41 acres of forage crops, whilst 297 acres are devoted to pasture and 202 acres to fallow. He would ask the visitors to accompany him on a tour of

inspection through the various wheat fields. The work undertaken at Rutherglen comprised ten distinct sections. Apart from the bulk wheat plots which were sown to provide seed wheat true to name for distribution among farmers, there were a series of plots dealing with such practical problems as (1) the top-dressing of pastures; (2) the improvement of cereals; (3) permanent rotation plots; (4) permanent fertilizer trials; (5) cultural and tillage trials; (6) variety wheat, oat, and barley trials; (7) feeding off tests; (8) green manure tests; (9) soil moisture and soil nutrition tests. The outstanding features that would probably appeal forcibly to every one who inspected the crops may be stated as follows:—

1. The remarkable improvement effected in the stock-carrying capacity of poor North-Eastern land by continuous treatment with superphosphate and small dressings of lime. The results are so apparent to the eye that they could not fail to convince every practical farmer present.

2. The superiority in appearance and in probable net returns of wheat grown in rotation with forage crops fed down by sheep to every other form of crop rotation.

Visitors inspecting Pasture Top Dressings, Rutherglen State Farm, November, 1915.

3. The value of lime as a soil ameliorator, both on crops and on grass in normal or wet seasons in typical North-Eastern country.

4. The value of heavy dressings of phosphates for profitable wheat-growing.

5. The success of all early-sown crops.

6. The superiority of mid-season and late-maturing varieties, such as Penny, Yandilla King, &c., in seasons such as those we have just passed through.

The Inspection.

By this time there were about 500 present, who accepted Mr. Richardson's invitation to inspect the plots. The procession through the fields was a long one, and 135 vehicles, including motors, drags, cabs,

buggies, and gigs, were counted passing through a gate leading from one paddock to another. At one period, while an 80-acre paddock was being inspected, it was entirely surrounded by vehicles, and was an imposing sight.

What the Farmers Saw.

THE BULK CROP.

The bulk crops, comprising 600 acres, looked very imposing, being beautifully headed, free from weeds, and well laden with grain, and excited most favorable comment from the visitors. Special interest was evinced in a particularly fine crop of Penny wheat. Other wheats showing remarkably well were the late-maturing varieties like Yandilla King, Marshall's No. 3, Currawa, and Dart's Imperial.

All oat crops, comprising over 120 acres, were particularly heavy, and astonishment was expressed on all sides as the long line of vehicles drove between an avenue of succulent well-headed Algerian oats standing 6 feet high, the average yield of which was estimated by farmers present to exceed 3 tons of hay per acre.

Mr. A. E. V. Richardson, M.A., B.Sc., Agricultural Superintendent, demonstrating to Farmers the value of Top-dressing Pastures and showing how Stock-carrying Capacity is increased by the application of Superphosphate, Rutherglen State Farm.

THE PASTURES.

The outstanding feature of the afternoon was the interest manifested in the pasture top dressings. Wherever phosphates, in the form of super. or basic slag was applied to the natural pasture, an extraordinary impetus was given to the growth of clovers and trefoil, and the stock-carrying capacity of the pasture was more than doubled.

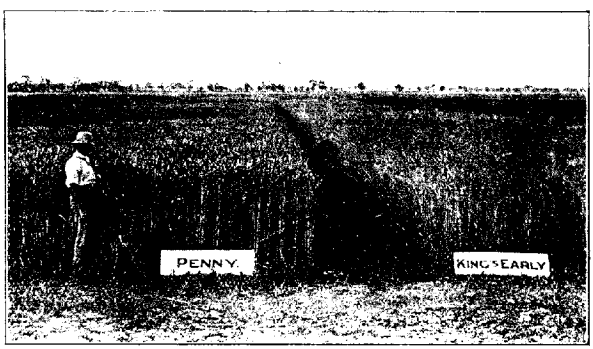
As one practical farmer expressed himself on witnessing the result of the dressing—"The addition of a few hundredweight of super. or

basic slag has transformed this poor, natural pasture into grazing land equal to that of the Western District or Gippsland." The sight of the dense mat of clovers and trefoils on the plot treated with 1 cwt. of super. and 10 cwt. of lime, as compared with the paucity of herbage on the untreated plot, will long live in the memory of those who had the privilege of witnessing it.

This demonstration was one of the most convincing of the afternoon, and was a general topic of conversation subsequently. The bearing of this experiment as a profitable business proposition can hardly be exaggerated. It means that by the addition of a few hundredweight of super., supplemented with an application of lime, millions of acres of naturally poor grazing country in the north-east would be enhanced in value, and the stock-carrying capacity increased almost beyond belief.

STUD CEREALS.

Great interest was manifested in the stud cereal section, which was really a nursery where new cereal creations were being evolved.



Plots showing method of Testing the Yielding Capacity of Varieties of Wheat, Rutherglen State Farm.

Here could be seen, in all stages of development, crossbred wheats of great promise. The long, square, compact heads of some of the new crossbred wheats appealed to the farmers with convincing force. A cross of Indian F. on Federation looked particularly well, and compared more than favorably with Federation plots grown alongside as checks.

The study of this section was greatly added to by a blackboard demonstration and lecturette by Mr. Richardson, explaining how wheats are crossed and the results of the crossing, and a practical demonstration by Mr. T. M. Whelan, the wheat expert, showing how the pollen was transferred from one wheat to another.

SOIL TEMPERATURE AND EVAPORATION TESTS.

In railed enclosure was an array of meteorological instruments, and the bearing of soil temperatures, evaporation, and transportation tests on ordinary farm practice was concisely demonstrated. The water

requirements of various farm crops—that is, the amount of water required to produce one ton of hay or one bushel of wheat—was being tested in a series of pot tests, as well as the methods by which the soil moisture could be conserved and economized.

Mr. Richardson further explained that from the records already taken, one inch of rain, if it could be all utilized by the crop and none lost in evaporation from the soil, would produce 2.5 bushels of wheat, 3.6 bushels of barley, 1.8 bushel of oats, and 2.6 bushels of peas. It would be seen from these figures the immense improvement possible in Victorian agriculture. The great part of the wheat area of Victoria has a rainfall of 10 inches in the growing period of wheat. By careful fallowing we find, by actual field tests, that in normal seasons an extra 3 or 4 inches of rain can be conserved from the preceding year. This brings the average effective rainfall up to 13-14 inches. Under the best conditions of farming, however, about one-third of the soil moisture is lost in evaporation during the growing period; consequently, this leaves 9 inches of water to be actually used by the crop. This is sufficient for an average yield of 22½ bushels of wheat per acre. The average yield of Victoria is less than half this, however, from which it may be inferred that much improvement can be made in our average farm practice before we approach the limit of our soil resources. Although the tests were only commenced this year, it is already evident that the application of soluble phosphates, especially in moderately heavy dressings, makes the plant more economical in its use of water, and this probably explains why such a small dressing of super. as 56 lbs. has such an extraordinary effect in raising our wheat yield. The superphosphate most probably has the effect of increasing the concentration of the soil solution to such an extent that the plant does not need to take in such large quantities of soil water to get the necessary phosphate for building up its tissue.

Pot Culture Experiments.

In a newly-erected pot culture house at the main buildings 150 pots were devoted to the determination of the water requirements of all our farm crops, weeds, and native grasses, and how far the water supply of the soil can be economized by the use of varying types of fertilizers and the methods of cultivation.

Permanent Rotation Plots.

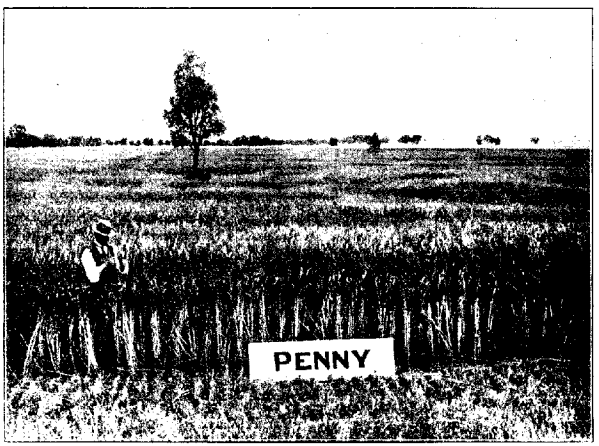
These plots conveyed their lessons very clearly, even to the lay mind. One outstanding feature was the superiority of wheat crops grown in rotation, with forages fed off, over wheat grown after cereals, or even bare fallow. This should be a source of satisfaction to farmers in this district, in that it enables the non-productive fallow to be dispensed with, and at the same time improving the yields of their regular crops. The practice on the farm was to sow down crops like rye and vetches, rape, peas, and barley, feed them down closely well into the spring, after which the land is worked up as a fallow for sowing wheat the following winter.

Forage Crops.

These crops not only assisted in improving the fertility of the soil, but also showed a considerable profit due to their grazing value.

AN EARLY AND LATE STUDY.

The early and late sowing tests demonstrated very clearly the advantages of early sowing in a season such as that through which we are



View of Bulk Wheat Fields, Rutherglen State Farm, showing Varieties grown for Seed Purposes for distribution to Farmers.

Binders at work on heavy crop of Algerian Oats, Rutherglen State Farm.

passing. It was noticeable, too, that early sowing, besides giving better crops, led to great economy in seed, for 60 lbs. of Federation seed sown in May gave an equally thick crop as 90 lbs. sown early in July. More-

over, the early sown plots, by reason of the fact that they get their roots well down into the subsoil while the soil temperatures are congenial, give increased growth, which can be fed off by sheep with advantage during the winter months when feed is so often scarce.

FERTILIZING TESTS.

The permanent fertilizer tests showed evidences of water-logging in parts. Still, the lesson they convey is clear and unmistakable. Superphosphate, especially of dressings from 1 to 2 cwt., is still showing superiority over all other phosphatic manures.

Plots treated with lime in quantities ranging from 5 to 10 cwt. per acre, especially when supplemented with 1 cwt. super., are showing up in marked contrast with unlimed sections.

Nitrogenous fertilizers have shown little effect, possibly owing to the activity of the nitrifying organisms which work so actively in well cultivated fallows.

VARIETY AND SELECTION WHEAT PLOTS.

These plots are in reality the testing ground and nursery of the bulk wheat plots, and were next examined. The prolificacy of the bulk wheats on the farm is kept up by a process of continuous and uninterrupted selection in the smaller variety and selection plots. Seventeen varieties, all of high merit, were here seen growing side by side. The produce from these plots will furnish next season valuable seed to replenish the farm stocks, and will ultimately be distributed among farmers as select bred seed.

OTHER PLOTS.

Green manurial and feeding off tests were showing the same differences as were noticeable on the permanent rotation field. The effect of the prior treatment with forage crops on the present season's wheat is remarkable.

Among many other features of interest were plots of selected malting and feeding barleys, oat varieties, and eight different varieties of peas.

SHEEP.

Sheep men manifested interest in crossbred lambs sired by Suffolk, Shropshire, and Southdown rams, and a useful comparison as to their relative merits was thereby illustrated.

AFTERNOON TEA.

On returning to the woolshed, from where a start was made, every one was ready to accept the hospitality of the Department at afternoon tea, and it was thoroughly enjoyed.

The Speeches.

Mr. P. J. Moloney, M.H.R., stated that it had been a pleasure to him to accept the Minister for Agriculture's invitation to be present that day. He had given up another engagement to attend, and felt that he had been more than repaid. It had been an afternoon of instruction and a

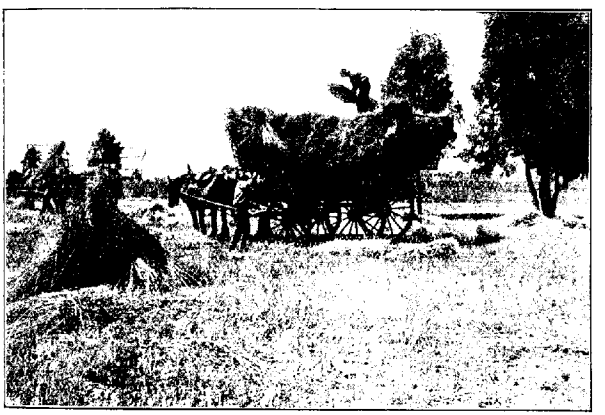
surprise to him to see what was being done so thoroughly by the Department to assist the producer. Mr. Richardson had that afternoon explained everything so thoroughly that they all would leave with a knowledge of what was required to get the best results from the land. The crops were excellent, and the management generally were to be congratulated. He was sorry that the Minister was not present to give a *résumé* of what was being done in connexion with the big question—handling of the wheat harvest—as it would have been an opportune time. He was sorry that he was unable to give some reliable information, as the scheme was not yet fully developed. But he could say that it was necessary to do something in order that the grower was not exploited. It was not a party question, and he had been working with Mr. Manifold, Mr. Rodgers, and other country members to get the very best for the farmers. They had had several interviews with Mr. Hughes. This year it was estimated that there would be a yield of 150,000,000 bushels of wheat, which was an abnormal yield, as 100,000,000 bushels was

View of Hay Wheat Tests, Rutherglen State Farm.

estimated as the previous record yield. With this large increase of yield, and a decrease of 40 per cent. in shipping facilities, it was necessary to do something, as exporters would only have bought what they could ship away, and the farmer would then be left helpless; therefore, it was the duty of the Governments to do something and get the best possible bargain for the producer. It was proposed to advance the farmers 3s. f.o.b., less 3¾d. local charges. At normal times it was difficult to get the required shipping, and with a reduction of about 40 per cent. of bottoms available for oversea transit it was necessary to do something, otherwise there was the possibility of the farmers being exploited. The Government were advancing 3s. per bushel, less the 3¾d. charges, and in November there would be a dividend on the prices realized on the London market if present prices were maintained. Until the final decision of the Conference was arrived at, no definite information was available. Mr. Hughes had informed him that as speedily as possible

after the decision was finally arrived at a pamphlet would be issued and given to the press for publication. (Applause.)

Hon. J. Bowser, M.L.A., stated that the visit of inspection that day was a grand object-lesson of the value of the work being carried out in the interest of the producers by the Department, under the direction of Mr. Richardson and his officers—Messrs. Adcock, Harmer, and Whelan. It was the third gathering of this character that had been held at the College, and each year the gathering was growing in importance, and its utility was being impressed upon the public. It had been a fine lesson, showing what could be done by the application of science into practical work. The crops were a credit to the officials. To look at the pastures and see the results of top-dressing was quite a revelation, and made one begin to think what the resources of Australia were if they could put three or four sheep on to land where formerly there was only one. Besides the fine work that was being carried out by the



Haymaking.—Carting a heavy crop of Wheaten Hay (Huguenot), Rutherglen State Farm.

Department in the interests of the farmers and vine-growers, there was another branch—the social one—the training of the wards of the State to be practical agriculturists and viticulturists. It was the only institution of the kind in the State, and he had been informed that many of the lads who had been trained at the College had received good positions. These lads had been trained to be good citizens, and they had shown their appreciation of what the Department and Mr. Adcock, the Principal of the College, had done for them, and no less than 30 were either at the front or on their way there to uphold the honour of the Empire. (Applause.) He had to again express his regret at the absence of the Minister, but if the residents of the district wished to hear Mr. Hagelthorn's opinion on the wheat-handling question, he would be only too pleased to visit the district. Personally, he could not give details of the wheat-handling proposal of Australia until the

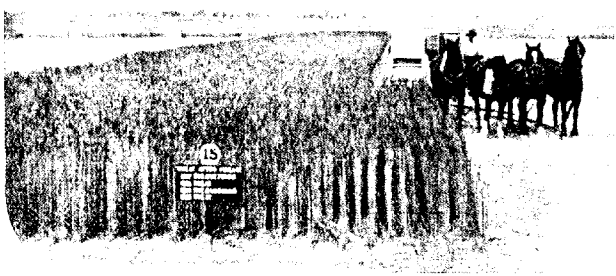
Conference of the Prime Minister and State Ministers had concluded their deliberations. But he understood that the final arrangement would be completed by Monday or Tuesday. He understood that the whole question turned upon the shipping freight available, which was 40 per cent. short. But whether the wheat could be handled better by the Government acting as a beneficent middleman, or by being dealt with through the ordinary channels, it was impossible to say until he knew the details of the scheme. But there was one thing, the grower would receive his 3s. per bushel, and in November a dividend if the prices of wheat were maintained on the London market; there was also a probability of the Government making a loss on the transaction. It was a great pity the producers were not organized in a thorough manner, so that they could speak definitely their requirements to the Government,

Pot Culture House, showing the method of determining the Water Requirements of Farm Crops, Rutherglen State Farm.

and assist in making their own arrangements. He would ask Professor Dr. Cherry to address the gathering. (Applause.)

Dr. Cherry stated that he wished to congratulate Mr. Richardson on the excellent wheat crops, which were produced under circumstances not altogether favorable. Some present would remember the establishment of the College, which was perched up on the hill with 80 acres of land. At a later date 800 acres were taken out of the forest reserve and added to the College lands. In this State, lands that were put into forest reserves were not good enough for anything else, and he believed it was generally termed third class land, which was poor land, and it was on this land that Mr. Richardson had worked. They had no doubt noticed during the day the value of using superphosphate drilled in with the seed. Other interesting studies had been the pastures and the cultiva-

tion of new varieties of wheat. In a season like this, when there was an estimated yield of 150,000,000 bushels, did they ever give time to reflect and consider what they were indebted to Mr. Farrer, of New South Wales, who, by experiments, had introduced Federation wheat, which was estimated to have increased the yields of wheat production 10 per cent. Mr. Richardson was working on correct lines, and it may eventually lead to the producing of a variety even more prolific than Federation. In the production of the wheat yield large quantities of phosphates were used, amounting to nearly £1,250,000 worth. The phosphates which they were putting into the ground were being sent away from the country, as most of it went into the wheat, and four-fifths of it go into bran and pollard. He strongly urged the keeping of the phosphates in the State, and why could we not export our harvest in the form of flour instead of wheat? It was known that Australian wheat produced the best bread in the world; therefore, why should Australia



Harvesting Experimental Plots, Rutherglen State Farm.

not do its own milling, export the flour, thus causing extra labour and preserving the bran and pollard, which could be utilized for stock feeding during the months when the pastures were low, namely, from February to April. (Applause.)

Cr. A. H. Stewart (Mayor, Rutherglen) stated that he had great pleasure in moving a vote of thanks to Mr. Richardson for the instructive demonstrations that he had given, and to Mr. Moloney, Mr. Bowser, and Dr. Cherry for their excellent addresses. It was the first occasion that he had attended a field day, and the afternoon had been very interesting, and showed what was being done in the interests of the producer.

Cr. Prentice, J.P., in seconding the motion, stated that it was evident that Mr. Richardson was working on lines that would produce the very best results, and in his work he was ably assisted by Messrs.

Adcock, Harmer, and Whelan. The experiments seen that day illustrated clearly how comparatively poor land could be made productive. He would ask that the vote of thanks be carried by acclamation. (Applause.)

REPLY.

Mr. Richardson, in replying to the vote of thanks on behalf of the Department, stated that the success of the gathering was largely due to the excellent manner in which the staff, under Messrs. Adcock (Principal), Harmer (Farm Manager), and Whelan (Wheat Expert), had carried out their work. In reference to the shipment of wheat, he thought the Government was doing the best thing possible, in view of the abnormal conditions ruling in the freight market, and was certainly doing better than any private firms could possibly do. This was shown recently when the Imperial Government desired to commandeer fourteen transports; the Commonwealth Government stepped in, and pointed out that if Australia was to do its part in financing her share of this great war and maintain her own men, facilities would have to be available for the handling of the harvest, and the Imperial Government immediately released the transports for the conveyance of Australian wheat; this would certainly not have been done for any private firm. At present the wheat value was 57s. 6d. per quarter on the London market, equivalent to 7s. 3d. per bushel. The Governments were contemplating handling the whole wheat harvest with an advance of 3s. to the producer, less 3¾d. charges. If the present price was maintained on the London market, after allowing for freight and other handling, the farmers' wheat would bring a price equal to 4s. 8d. per bushel, and in November the farmer would be getting an addition of 1s. 8d. per bushel on his 3s., which would be a very satisfactory result; but they had to remember that the figures he was giving was on present London prices being maintained. Nor was there any reason, in spite of the record American crop, why these prices should not be maintained. On the other hand, if the Government had not stepped in, farmers would be rushing to sell their wheat, agents would be unable to get shipping space, and with a big demand for space freights would go up and prices would fall. Those who got in early would probably get 3s. 9d. or 4s., but what price would the great masses of farmers get? In normal years freight was 30s., and now it was 85s. What would it go to if there was a rush for space with only 60 per cent. of the shipping available. He held no brief for the Government, but thought the scheme proposed would work out in the general interest of the producer. In reference to the 3¾d. local charges, they had to remember that wheat shipped from Australia across the line increased considerably in weight, and the value of this increase would be credited to the pool, and would be a good set off against local charges. (Applause.)

The gathering then broke up with three cheers for the College officers and employees, and three for the boys in Gallipoli.

Commentary.

The farmers of the Rutherglen district who attended this field day were unforgettably impressed by the ocular demonstrations they witnessed, and obtained a practical conception of the new and rapid

developing era, aiming at enhanced agricultural production in the north-eastern corner of the State.

It is also clear that Farmers' Field Day bids fair to become a popular annual event at Rutherglen, and it is to be hoped that the departmental authorities will see their way clear to devote a whole day to future inspections and demonstrations.

VICTORIAN FRESH GRAPES AT THE PANAMA-PACIFIC EXPOSITION.

(By F. de Castella, Government Viticulturist.)

With a view to further testing the possibility of developing an export trade in fresh grapes on a large scale, advantage was taken of the opportunity presented by the Australian display made by the Commonwealth and several of the States at the recent Panama-Pacific Exposition. Victoria contributed a considerable quantity of fruit, portion of which consisted of grapes.

Seventy cases of grapes of proved shipping varieties were purchased by the Department of Agriculture. Of these, 62 were sent to the Exposition. The balance was retained in the Government Cool Stores for further observation. Fifty cases were grown by Mr. R. G. Cameron, of Merbein, near Mildura, and twenty by the late J. Grimmond, of Wahgunyah.

The Merbein grapes were mainly Ohanez, but comprised also Purple Corniehon, Flame Tokay, and Santa Paula. They were grown under irrigation. The Wahgunyah consignment consisted mainly of Waltham Cross, but included also Wortley Hall, Purple Corniehon, and Valensy. These were grown on a sand hill vineyard adjacent to the Murray, and were not irrigated. The fact that they stood the test so well after the disastrous 1914-15 summer is further proof of the well-known resistance to drought of vines grown on deep sandy soil.

The following particulars as to conditions under which the grapes were shipped may prove of use to intending exporters of grapes:—

The package used was the West Australian export grape case, which contains 28 lbs. of grapes and nearly 5 lbs. of granulated cork filler. The outside measurements are $23\frac{3}{4}$ x $14\frac{3}{8}$ x $7\frac{3}{8}$ inches, or 2,688 cubic inches. It has a transverse partition. The timber is white pine (undressed), the partition and ends being $\frac{3}{8}$ inch thick, whilst the bottom, sides and top are $\frac{5}{16}$ inch. By measurement there would be 25 cases to the ton of 40 cubic feet, or 53 cases, by weight, to the ton, on the following basis:- Grapes, 28 lbs.; cork, 5 lbs.; case, $8\frac{1}{2}$ lbs.; total $41\frac{1}{2}$ lbs. The internal capacity, exclusive of partition, is 1,890.84 cubic inches, or .84 bushel.

The Merbein grapes were sent in two consignments; the first (eight cases) leaving Merbein on the 25th February, and the balance on 4th

March. They both reached the Government Cool Stores two days later, being stored at a temperature of 32° F. until shipped. They were conveyed on the railways in ordinary trucks (not louvre), and were not cooled in any way. Both consignments were shipped to Sydney per the s.s. *Karoola,* of the Oceanic line, on 11th March, and there transhipped to the s.s. *Sonoma,* of same line, leaving Sydney for San Francisco on 13th March.

The Wahgunyah grapes were sent to Melbourne in a louvre truck (not cooled in any way) on 16th March, going into the Government Cool Stores the following day. They were shipped to Sydney by the s.s. *Karoola* on 8th April, being there transhipped to s.s. *Ventura* (Oceanic line) for San Francisco, which sailed on 10th April.

Arrangements were made for the grapes to be carried at a temperature not lower than 31° F., but not higher than 34° F. In the Government Cool Stores they were kept at 32°.

Freight charges were as follow (per ton of 40 cubic feet), Melbourne to Sydney, 25s.; Sydney to San Francisco, 60s.; transhipment at Sydney, 3s. 6d.; a total of £4 8s. 6d. per ton of 40 cubic feet, or 2s. 11½d. per case.

Reports concerning the fruit were received from Mr. C. K. Harrison the officer representing the Department of Agriculture at the Exposition, from which the following extracts refer to grapes:—

Writing on 7th June, he said—"All the grapes opened up very well indeed. The Purple Cornichons seem to be one of the best grapes sent over; at any rate, we are receiving a number of inquiries about this variety."

It may be mentioned that the grapes landed in San Francisco in better order than the apples.

Writing on 8th October, he said—"As Mr. de Castella made a request for a report on the general behaviour of the grapes which were on exhibit here, I now beg to supply you with this information. All our grapes arrived in good order, being well packed. The first lot to arrive included Ohanez, Purple Cornichon, Flame Tokay, and Santa Paula, and the second consignment comprised Waltham Cross, Wortley Hall, Purple Cornichon, and Valensy. On being opened up all the grapes were in very fair condition. The stalks of the Flame Tokay were somewhat shrivelled, likewise one case of the Purple Cornichon, but in flavour they were both good. The Waltham Cross seemed to have lost a good deal of their original flavour, and were, in my opinion, the least desirable of any in this respect. The grapes of this variety did not keep very well, they started to decay on one side of the case. As regards keeping quality, the Ohanez were easily first. These grapes kept almost in perfect condition up to the closing of the refrigerator, about ten days ago. I have still one case in the pavilion; they are sound and retain most of their flavour."

Mr. Harrison reports that, owing to a change in the staff, the detailed record kept at his request by the foreman was mislaid, so that most of his remarks are really the results as showing at the closing of the refrigerator and from memory.

As regards the cases which were kept back; it was intended to make a display with some of these at the Royal Agricultural Society's September Show, which, however, was not held. The grapes were

inspected at various dates, and for a considerable time they all kept in excellent order. On 30th June, at a lecture on grape shipment delivered at Mildura by the writer and Mr. W. French, Engineer in charge of Government Cool Stores, a sample of several varieties, mainly Ohanez, Waltham Cross, and Valensy, was exhibited. At this date all the varieties kept back were in excellent order. By the 9th August, however, when they were again examined, there was a marked difference between the Ohanez and all the other sorts, which showed more or less signs of deterioration, whereas the Ohanez were still in excellent order and perfectly marketable. The Waltham Cross from Wahgunyah were still good in flavour, but, owing to the presence of a few decayed and juicy berries, the condition was faulty. The Purple Cornichon were better than the Waltham Cross. Their main fault, after long storage, is the ease with which the berries fall off. They present the peculiarity of detaching at the stalk, but without any breakage of the skin, so that the other grapes do not become juicy as occurs with so many varieties. The Valensy kept in very fair order until 26th September, when the last of this variety was removed from the Cool Store. Flavour was still remarkably good, though appearance was somewhat faulty.

On the 12th October the last case of Ohanez were still in remarkably good order; so much so that some of them were taken to Mildura by the writer and exhibited at the lecture on 13th October, nearly seven months after their removal from the vine.

The result of the shipment confirms previous experience, which points distinctly to Ohanez being absolutely the best keeping grape known. It also shows that several other sorts, though not possessing the same keeping power, can be shipped to the other side of the world in marketable condition, in spite of the absence of refrigerated transport on the railways and transhipment at Sydney. Rectification of these defects would undoubtedly render possible the shipment of Muscats and other less resistant sorts.

A variety worthy of special mention is Valensy, which promises to surpass the well-known Doradillo as what might be termed a multiple purpose grape; being oval, it is of more attractive appearance, and it seems to be quite as prolific a bearer. As a result of experiments conducted at the Rutherglen Viticultural Station, it is also proving superior to Doradillo for wine-making, and possibly also for distillation. Several Rutherglen growers who specialize in table grapes have formed a very high opinion of this variety, and are propagating it extensively. From the absence of special mention by Mr. Harrison, it appears to have stood the practical test of shipment better than Waltham Cross.

THE DAIRY COW AS A MACHINE.

By B. A. Barr, Senior Dairy Supervisor.

A machine is a contrivance which, if supplied with sufficient power, is able to perform work. By its use some of the potential energy of the fuel is transformed into work. The work performed by a milking cow is in the form of milk production.

To enable a machine to do work, it is necessary to supply it with sufficient motive power, such as steam, gas, petrol, electricity, &c., all of which possess varying capacities for work.

The dairy cow requires food as fuel, and just as the different fuels used to drive machines vary in value, so do the different foods available to the cow vary in their value for milk production.

Under similar conditions 1 ton of coal will perform a greater amount of work than 1 ton of wood, and similarly 1 cwt. of green oats will produce a larger quantity of milk than 1 cwt. of green maize, or 1 cwt. of bran will give a much greater return than 1 cwt. of lucerne hay. All the energy of the fuel which is burned in the furnace of a boiler or directed to the combustion chamber of a gas engine is not transformed into work. Some of the fuel is not completely burned, and some of the products of combustion escape in the air. This represents a considerable loss. In the most efficient internal combustion engine only 40 per cent. of the total energy of the fuel is transformed into work, and in many steam-driven plants not more than 10 per cent. is recovered. A similar loss results in feeding cows, when, according to the capacity of the individual animal, from 20 per cent. to 45 per cent. of the total energy of the fuel is transformed into milk. A portion of the food is not digested, and from this no milk can be secreted. Portion of the digested food is required to repair wastage and to maintain the body temperature. When wet cold food is given during cold weather a considerable amount of food is burned to raise up to body temperature the cold contents of the stomach. What is left after these demands is available for milk production.

The fuel supplied to a machine is used only for the production of work. When any part wears, either it is replaced by a duplicate or taken out, turned, and re-fitted; but in the case of the cow the food is converted into work and also keeps the machine in repair; in other words, whilst supplying the secretory cells of the udder with digested food-material for conversion into milk it also maintains the bodily condition and health of the animal.

The value of a fuel for driving a machine is determined by chemical means and by the rapidity and completeness of its combustion. The food value of a fodder may be somewhat similarly determined by its chemical constitution and its digestibility. Just as certain fuels give best results when directed to particular classes of work, so certain foods give best results for milk production. The dairy cow requires not only a larger amount of food, but also a different kind of food from that of the dry or fattening animal. The larger amount is required because the work performed is greater; the different kind is required because a different class of work is done.

In one case the food is used to promote an excessive development of flesh and fat tissue and in the other for conversion into milk.

If we were assured of a continuous growth of pasture grass throughout the year, in most cases hand-feeding would be a matter for small consideration; but, owing to seasonal influences, a plenteous supply is followed by periods of scarcity, and in so much as dairying is only profitable when a long milking season is secured, the grass needs to be supplemented by grown or purchased feeds.

The demand for additional feed usually comes in the early summer, to meet which maize and millet are usually grown, and complaint is made that these do not effectively check the decrease in the milk yield. Millet has a higher feeding value than maize; it also possesses the advantage of being easily grazed, whereby labour is saved, and, in addition, is available for use at an earlier period than maize. Maize yields a greater amount of fodder per acre, and any surplus can readily be made into silage. Where suitable conditions obtain both crops should be grown, but alone these do not meet the demands of a good milking herd at this particular period.

Usually when these fodders are fed the grass has shed most of its seed, and what remains in the paddock is a hard tough straw difficult to digest. The most valuable contents of the growing grasses have concentrated in the seed, which on ripening falls to the ground. Maize and millet do not contain, in the necessary amount and proportion, that nourishment of which the dried grass is deficient. For this reason each season the milk yield decreases more rapidly at this particular period than if sufficient suitable pasture or balanced feeds were available. To check this rapid decrease and to balance the maize and millet, some clover or lucerne, either green or as hay, should be given. To expect a cow to milk heavily when fed on a little dried grass supplemented by maize is as reasonable as asking oneself to perform hard and continued manual labour on a little dry bread supplemented by boiled cabbage. The reason in both cases is the same. The food does not contain the requisite constituents nor sufficient energy to do the work: and those constituents which the food contains are not present in that proportion which produces the best return. Should home-grown lucerne or clover not be available, in most seasons it pays to give a small amount of bran and pollard or gluten meal: say 2 lbs. bran and 1 lb. pollard, or 3 lbs. gluten meal daily in addition to the green fodder. Where maize is fed in the paddock, these may be given dry or mixed with a very small amount of chaff in the bails or in boxes. The above amounts must not be blindly used. The value of every ration depends upon the intelligence of the feeder. The amounts fed are determined by the price of butter fat, price of feed, and the amount of milk yielded by each cow. In many instances it is profitable to give a much greater amount, and in others a lesser amount will suffice. The object should be to maintain the milk flow, due allowance being made for the decrease resulting from the extending lactation period. If, as a result of the grass drying in the summer, the average decrease over one month be 8 lbs. per cow, of 4.5 per cent. milk, when butter fat is selling at 1s. per lb., the loss per cow will be 4d. per day. In other words, if, on 1st January the cows averaged 26 lbs. milk, and on 1st February averaged 18 lbs. per cow, each cow would be yielding ¾ lb. of

butter fat less on the latter date than on the former, besides the loss in skim milk. This is a very frequent decrease, and in many cases much greater than in the case cited; in fact, in some districts, where the cows are forced to depend solely on grass, herds milking heavily in early January are almost dry in March, and are given four to five months' spell before calving. Under such conditions dairying is not profitable.

Now, if 4 lbs. bran at £4 10s. a ton be added to the maize or millet it would provide sufficient nourishment to check this decrease, and not only is this gained, but a longer milking period is secured. The loss of butter fat has a value of 4d., whilst the cost of 4 lbs. bran at £4 10s. a ton is 2d., leaving a gain of 2d. per day in addition to more skim milk and an extended milking season.

Each farmer has a good knowledge of his own district and when the pasture usually goes off. Just before this time hand-feeding should be commenced. It is easier and cheaper to maintain the flow than to increase it after a rapid decrease.

It is expedient to supply feed in such amounts that, at least, it will equal the amount of nutriment lost to the pasture. In supplying purchased feeds to dairy cows, select those that are easily digested, as such give a quicker return. The cost of digestion in some fodders is very high, and by this cost will the value for milk production be reduced. The variety of food purchased should be regulated by the price, the amount of digestible matter, and its digestibility.

The finer the condition of the food the more easily will it be digested. At the same price bran is always preferable to lucerne hay. When feeding bran to dairy cows the addition of a little pollard increases the value of the ration, but it must not be fed in such amounts that costiveness results. Its use is largely determined by the nature of the rest of the ration. Large amounts may be fed when the feed consists mainly of succulent food than when dry feeds comprise the bulk.

During winter months from ½ to 2 lbs. crushed linseed meal or cocoanut oil cake may be added, according to yield. These contain a relatively high oily content, and are best suited for the production of body warmth during cold weather. Like a machine, the dairy cow should be kept working at her full capacity without over strain; since, in each case, it is under this condition that the greatest profit is made. Just as a factory with sufficient motive power to drive twelve machines at full pressure is more profitable than one with the same amount of power directed to twenty machines at half pressure, so the dairy herd of twelve good cows well fed is more profitable than twenty cows of the same quality underfed, whilst the initial cost and labour required is less.

It is only when the cow is getting as much food as she can transform into milk that she is milking her best, and in the fair-conditioned animal any excess above the requirement is shown by the animal increasing in condition.

RELATIONSHIP BETWEEN THE AVERAGE WHEAT YIELD AND THE WINTER RAINFALL.

By A. E. V. Richardson, M.A., B.Sc., Agricultural Superintendent.

That the Victorian average wheat yield is dependent on the rainfall during the growing period of the crop is a matter of common observation. That there is a definite relationship between the two, and that this relationship may be used to forecast the probable average wheat yield early in November is probably not suspected by the casual observer.

A comparison of the average wheat yields of Victoria for the past 25 years with the composite rainfall over the wheat belt from May to October throughout the same period appears to establish such a relationship. In order to determine the composite winter rainfall of the Victorian wheat belt, ten typical stations were chosen, and the composite average rainfall from these centres expressed in inches of rain was compared with Victoria's yield in bushels per acre. An extraordinary coincidence resulted. During the 25 year period the composite winter rainfall expressed in inches of rain at these centres corresponded almost exactly with Victoria's average yield expressed in bushels per acre. Thus the average rainfall for the period was 9.5 inches, and the average yield per acre 9.1 bushels, or for every inch of winter rainfall approximately an average of 1 bushel of wheat per acre was obtained.

The centres chosen were ten in number, and represented the chief districts in which wheat is grown. The centres were Mildura, Ultima, and Beulah, representing the Mallee areas; Nhill, Horsham, and Donald, representing the Wimmera; Shepparton, Echuca, and Bendigo, representing the northern areas; and Rokewood, representing the Western District.

The Mallee, the Wimmera, and the northern districts produced in normal seasons roughly 30 per cent. each of the wheat yield, whilst the western and central districts produced the remaining 10 per cent.

The composite winter rainfall of these centres may be taken as representative rainfall of the chief wheat-growing areas of the State.

That wide fluctuations in the rainfall occur will be apparent on considering the graph, which summarizes the winter rainfall at these ten centres for the past quarter of a century. The lowest recorded winter rainfall was at Mildura in 1914, when .73 inches of rain fell in six months. The highest recorded winter rainfall at these centres was in 1906, at Shepparton, when 19.13 inches fell in the six winter months.

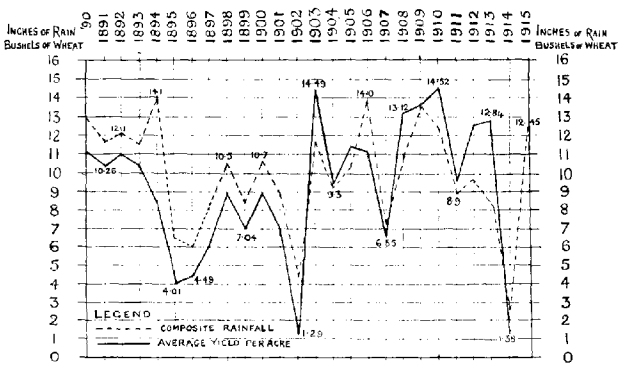
The accompanying graph expresses the variations in the composite winter rainfall in inches of rain, and the average yield in bushels per acre for each of the past 25 years. A close scrutiny of the graph will reveal a number of interesting facts.

Improvement in Victorian Agriculture shown graphically.

The outstanding feature of the graph is the improvement in efficiency in Victorian wheat growing during the past decade. This is shown not only in the improved averages reaped per acre, but more particularly in the number of bushels per acre won from each inch of available

rainfall. Now, the graph shows that the past 24 seasons may be divided conveniently into two periods of twelve years, each culminating in a disastrous drought. Curiously enough, the composite average winter rainfall for the first period is approximately the same as the composite average winter rainfall for the second period, namely, 9.5 inches and 9.8 inches respectively; but whereas the average yield per acre during the first period culminating in the 1902 drought was 7.4 bushels, the average yield for the second period culminating in last year's record drought was 10.88 bushels. Or, expressing the same facts in another way, whilst during the first period for every inch of winter rainfall our farmers secured .77 bushels of wheat per acre, in the second period they secured 1.12 bushels per acre for every inch of winter rainfall.

In other words, with similar soil and similar rainfall the farmers of the latter period secured 46 per cent. more wheat per acre than those of the former period.



Graph showing Relationship between the Average Wheat Yield and the Winter Rainfall.

And the graph shows this unmistakably. Note the relative positions of the dotted line representing the winter rainfall with the continuous line representing Victoria's average yield. For the twelve years prior to and including 1902 the rainfall line is consistently above the line representing yield per acre. In other words, during no single year during the first period did our farmers secure anything like an average yield of 1 bushel of wheat per acre for each inch of rain. But the drought of 1902 had its lessons. It synchronized with the introduction of superphosphates, the more general adoption of bare-fallowing, and more thorough methods of cultivation. 1903-1907 was the transition period when the value of the new practices that were revolutionizing wheat growing was being demonstrated. From 1907 onwards, with the single exception of 1914—the most disastrous drought within living memory—the line representing yield per acre is regularly above the

line representing the average rainfall. In other words, during this period farmers never reaped less than 1 bushel per acre for each inch of composite winter rainfall.

Lest it be supposed that we are approaching the limit of our production so far as yields per acre are concerned, it might be mentioned that carefully-conducted tests on the water requirements of wheat at Rutherglen during the past two years demonstrate that 1 inch of rain is capable of producing at least 2½ bushels of wheat, providing the whole of the water is used by the crop and none dissipated by evaporation.

At present, however, we in Victoria are securing less than half this amount, and the more widespread adoption of better methods of cultivation, systematic crop rotation, rational soil fertilization, and careful seed selection will gradually raise the average yield per acre until it approaches the above limit.

Effect of Abnormal Seasons and Crop Conditions.

The graph shows that the average yield per acre closely follows the composite winter rainfall. This is particularly true for normal seasons. Occasionally, however, we get an unusually wet season or a disastrous drought.

The two wettest winters on record during the period under review are 1894 and 1906. In both these years the composite rainfall exceeded 14 inches at the ten selected centres during the six winter months. Many of the crops were waterlogged during the winter months, and ultimately the yields were much lower than in seasons of normal rainfall.

During the two drought seasons, 1902 and 1914, there were whole districts where the crop was an absolute failure. The rainfall last year at Mildura during the six winter months was less than 1 inch. Little wonder that no crop was reaped.

Looking over the chart, it is apparent that the best average yield is obtained when the composite winter rainfall lies between 10 inches and 13 inches.

If a larger number of centres were chosen it is likely that the approximation of the graphs of rainfall and crop yields would be even closer. Absolute agreement could not be expected, however, for the reason that crop yields are dependent on other factors than rainfall, though rainfall is the dominating factor. For example, fungoid pests such as rust, smut, takeall, affect the crops in some degree every season, but in some years the seasonal conditions are highly favorable for fungus diseases, and heavy toll is levied on the wheat crops.

Again, the premature appearance of continuous hot winds just as the crop is filling depresses the yields. Untoward accidents, such as widespread heavy hailstorms and violent winds at the time of ripening of the crop, materially lower the yield. On the other hand, a long cool spring, with mild spring temperatures and opportune showers, as in the present season, following on a normal winter, would tend to unusually heavy crops. Finally, good seeding rains and early November rains have a stimulating effect on the crop averages.

Possibility of Forecasting the Crop.

If the influence of these factors be taken into consideration, it is apparent that the graph suggests a method of forecasting approximately

the average yield per acre early in November, and with a reasonable degree of approximation. Thus the winter rainfall at the selected centres can be determined on 1st November, and the composite rainfall multiplied by a given factor will give the approximate yield per acre. During the past twelve years the average yield for each inch of winter rainfall has been shown to be 1.12. It has already been shown that this factor must gradually increase as farming methods become more efficient.

Assuming, however, that this average ratio of the past twelve years will hold for this season, it means that the average yield per acre of Victoria for 1915-16 harvest will probably be $1.12 \times 12.45 = 13.94$ bushels per acre.

The advantage of such a method of forecasting the harvest lies in the fact that it can be used to gain an idea of the approximate harvest long before the ordinary official statistics published by the Government Statist and the Railway Department are available. Moreover, the only data required is the rainfall figures for the ten centres. Early in November it was necessary to gain an approximate estimate of the wheat crop of Victoria, in order to allocate freights under the Commonwealth Wheat Marketing scheme.

As official statistics showed that the area to be cut for grain would be 3,800,000 acres, the Agricultural Department estimated the new crop on 7th November at $3,800,000 \times 13.94 = 53,000,000$ bushels.

Early in December the Railway Department estimated the crop at $52\frac{1}{4}$ million bushels, and the Government Statist at $50\frac{1}{2}$ million bushels.

Summary.

The main interest of the graph lies in the fact that it shows more or less completely—

(1) The quantitative relationship existing between the average wheat yield and the rainfall.

(2) The gradual improvement in our agricultural methods, as illustrated by the increasing amount of wheat produced for each unit of rainfall.

(3) That it is possible to estimate with some degree of approximation the probable crop of Victoria early in November from a knowledge of the rainfall at typical wheat centres.

WHEN resting horses during the spring and summer work always turn their heads towards the breeze. They will cool off much more quickly, and will be more benefited by the short respite. While they are standing hold the collars off their shoulders for a few minutes, and, at the same time, give each shoulder a good rubbing with the hand. This removes sweaty grease and dirt, cools and helps to toughen the shoulders, and is a great aid in the prevention of scalding.

A DULL hoe never kills as many weeds as a sharp one, and is harder to use. Five minutes' work with a file or emery wheel will do wonders towards killing the weeds in the potato or onion crop.

REPORT ON EXPERIMENT IN PICKING, PACKING, HANDLING, COOL-STORAGE, AND TRANSPORTATION OF PEACHES.

By E. Meeking, Senior Inspector of Fruit for Export.

INTRODUCTORY.

During the visit of the State Rivers and Water Supply Commission to the Irrigation Settlements in the northern portions of the State, in January of the present year, the Hon. F. G. Clarke, M.L.C., one of the parliamentary party who accompanied the Commission, drew attention to the extremely large area recently planted, and in course of being planted, with fruit trees of various kinds, consisting mainly of peach and apricot trees. These all showed signs of the most vigorous growth, and gave promise of yielding, in the immediate future, prolific crops of high grade fruits.

Considering the experience of Ardmona, Kyabram, Lancaster, and other old-established fruit-growing centres north of the Dividing Range, where for many years peaches and apricots of quality second to none in the world had been plentifully and profitably raised, it would appear that the outlook for the owners of the new plantations was extremely bright, and that the path to prosperity, or even to affluence, lay right beneath their feet.

The question of the profitable disposal of the prospective crops, however, kept obtruding itself upon the mind of Mr. Clarke, and after careful inquiry into and consideration of the facts, he arrived at the conclusion that when the new areas came into full bearing, not only the new settlers, but the whole of the peach and apricot growers of the State, would be faced with the problem of over-production, and consequently diminished profits, or perhaps actual loss. He reasoned that the flourishing condition of the settlers in the old-established centres afforded no criterion as to the future prospects of the industry, as the limited supply had hitherto fallen short of the demand, thus insuring good average prices, with attendant substantial profits. So far, the local and Inter-State markets had absorbed all that had been produced, and by their easy accessibility had enabled growers to place their fruit on these in good condition, without adopting any means other than those which lay at hand. With the over-supply of these markets which would invariably follow the greatly increased production, the disposal of the surplus crop elsewhere would become imperative, and would necessitate the introduction of special methods whereunder this could be ensured. This could be carried out in the five following ways:—

(*a*) Marketing the fruit in its fresh state by the application of specialized methods in picking, packing, handling, and transportation.
(*b*) Drying.
(*c*) Canning.
(*d*) Pulping.
(*e*) Jam-making.

No adequate provision to meet the prospective situation had been undertaken in any of the directions mentioned, and apparently the growers had not seriously considered the advisability of making a move. Up to the present, many of the Goulburn Valley growers have annually disposed of a proportion of their crop to Melbourne manufacturers for canning, pulping, and jam-making; but the outlet in this direction did not promise to be large enough to avert the threatened catastrophe.

When in London, Mr. Clarke had noticed peaches offered for sale in the markets and large retail shops at almost fabulous prices, and it struck him that if peaches could be landed there in large quantities, and in good condition, not only would the necessary outlet for the surplus be provided, but the growers would, in spite of the increased production, obtain even better returns than formerly.

With the idea of enlisting the assistance of the Department of Agriculture in this direction, he therefore approached the Hon. the Minister of Agriculture, and suggested that, with the aid of departmental officials, a lecturing tour be undertaken through the Goulburn Valley, with the object of inducing the help of growers in carrying out a series of experiments in the cool-storage and transportation of peaches. The Minister and Director readily consented to this, and on the 5th January, 1915, Mr. Clarke, Mr. P. J. Carmody, Chief Orchard Supervisor, and the writer left Melbourne. Ardmona was the first place visited, and after the object of the visit had been explained to a representative meeting of growers, all present expressed their willingness to contribute fruit for the purpose of the experiment. Kyabram and Lancaster were next visited, with similar results; and a visit to the newly-formed settlement of Nanneella, near Rochester, completed the tour. Although the growers at the latter settlement were unable to contribute any fruit, they were fully convinced of the value of the experiment, and were heartily in accord with the object with which it was being carried out. It was arranged at Ardmona, Kyabram, and Lancaster, that the writer should return the following week and supervise the packing and despatch of the fruit to Melbourne. A sheet, on which the following was typed, was supplied to each grower who intended to contribute fruit to the experiment: -1. Name and address of grower; 2. Locality; 3. Variety; 4. If irrigated, date of last irrigation; 5. Rainfall during preceding twelve months; 6. Stage of maturity of fruit; 7. Date and hour when picked; 8. Temperature at time of picking; 9. Kind of package used; 10. Wrapped or unwrapped (if wrapped, state number of wrappers used), XYZ and wood wool; 11. Type of car used (louvre, insulated, or ice car); 12. Temperature of car at time of despatch; 13. Date and time when despatched to Government Cool Stores; 14. Date of arrival at Government Cool Stores; 15. Temperature of car on arrival at Government Cool Stores.

I accordingly revisited Ardmona on the following Monday, 11th January, 1915, accompanied by a departmental fruit-packer, who attended to pack the fruit. The fruit was assembled at the orchard of Mr. A. Lonnie on the Tuesday morning, and, with the assistance of the growers, 20 cases were packed in various types of packages, then conveyed into Shepparton, and at 3 p.m. on the 13th January, 1915, were placed in the chamber of the Shepparton Freezing Works, which

the manager had kindly consented to reserve for this purpose. These were run down to 31 degrees F., and twenty-four hours later were despatched in an ice-car to the Government Cool Stores, Victoria Dock. The trucks had been iced in Melbourne before despatch to Shepparton, but as the bunkers were found to be nearly exhausted on the day when the fruit was loaded, the car was re-iced at Shepparton immediately prior to its departure for Melbourne, and left with the bunkers well filled. The temperature of the car prior to loading was 56 deg. F., and at time of arrived at the Government Cool Stores, Melbourne—fifteen hours later —the temperature was 50 degrees F., showing a fall of 6 deg. F.

Kyabram was visited the following day, and the fruit, which was assembled in the goods-sheds at the local station, was despatched immediately after packing in an ice-car, which was also re-iced prior to departure. In this instance, the fruit was not pre-cooled, as no means were available at Kyabram for this purpose. The temperature of the car immediately prior to loading was 53 degrees F.; and on arrival at the Government Cool Stores, twenty hours later, the temperature was 60 degrees F., showing a rise of 7 degrees F. The difference in temperature shown in the two cars at the conclusion of their respective runs was rather interesting, as illustrating the relative value of pre-cooling fruit prior to consignment against forwarding fruit in ice-car without first extracting the heat from the fruit. As no thermographs were installed in the cars, the variations in temperature during transit could not be recorded; but as the ice in the bunkers of the car forwarded from Shepparton showed less than 30 per cent. wastage at the end of the trip, the bunkers of the car despatched from Kyabram were found on arrival at the Government Cool Stores to be more than half empty, representing a loss in ice of over 50 per cent. Clear proof was thus afforded of the assistance which pre-cooling renders in holding the inside temperatures of ice-cars at a low uniform level during runs over long distances. The excessive melting of the ice in the case of the Kyabram car represented the work of extracting the heat from the fruit, and which, in the case of the car from Shepparton, had been effected by the pre-cooling; thus giving the fruit in this car the advantage of reaching a low temperature many hours sooner than was possible in the case of the non-pre-cooled fruit despatched from Kyabram. Had the run been extended over a much longer distance, say, to Sydney, re-icing *en route* of the car from Kyabram would have been necessary to hold the fruit at a low temperature. The low temperature of the car from Shepparton, however, could apparently have been maintained throughout the run without re-icing the car. In future experiments, it is hoped that self-recording thermometers may be installed in cars, when thermograph records may be kept of the fluctuations of temperature in cars in transit.

It was originally intended to record fairly elaborate data in connexion with the experiment, so that the problem of successfully transporting peaches over long distances could be studied from all possible stand-points. Notes were therefore taken of all the circumstances incidental to the experiment which perhaps might directly affect the result of same. It was found, however, that owing to certain difficulties this could not be carried out; so the notes were confined to those headings shown in the list hereunder. No record was kept of the ages of the trees from which the fruit was selected, whether trees had, or had

not, been manured, or of the quantity, nature, and frequency or application of such manure.

The fruit was placed in the Government Cool Stores, Victoria Dock, on the following dates:—Ardmona consignment, 14th January, 8 a.m.; Kyabram consignment, 16th January, 11 a.m. During the period of storage, the fruit was kept at a uniform temperature of 31 degrees F., in a chamber specially constructed for experimental purposes, which was fitted with the direct-expansion system. No tests were made under the air-circulating system, as all the chambers installed with that system were utilized for meat. The consignments were removed from the chamber on Friday, 5th March, 1915—seven weeks from date of storage, a period which would cover the time required to ship fruit to any part of the world. The cases were opened in the butter-grading room adjoining the storage chamber, in the presence of the Hon. the Minister of Agriculture, the Exports Superintendent, and a representative gathering of fruit-growers merchants, agents, and departmental officials. After the Minister had explained the object of the experiment, the fruit was examined by those present, and found to be remarkably sound and fine in appearance.

As one or two days elapse before fruit sold in the London and European markets can be disposed of by the retailers to the consumers, it was decided to keep the fruit for a corresponding period out of cool storage before examining it in connexion with the judging.

A committee, consisting of Mr. A. V. McNab, Secretary, Ardmona Fruit-growers Association; Mr. F. W. Vear, member of the executive, Central Fruit-growers Association; Mr. S. A. Cock; Orchard Supervisor, Department of Agriculture; and the writer, were accordingly appointed to carry this out; and on the following Monday, 8th March, 1915—three days after the original examination and removal from the cool chamber—the fruit was re-examined. It was decided to judge from the following stand-points:—(*a*) appearance, (*b*) soundness, (*c*) flavour; and the maximum points to be awarded with respect to these were appearance, 75 points; soundness, 75 points; flavour, 100 points—a total maximum of 250 points.

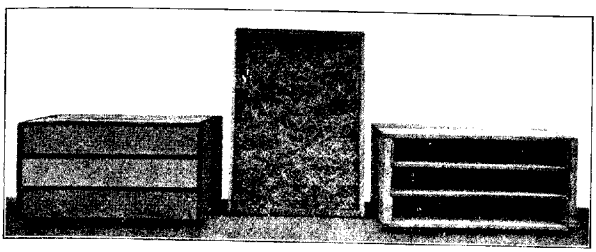
The appended tables show results of analyses of the judging.

Some of the data, which were given on the record sheets supplied to growers, are not shown in the headings to the tables, but are included in the foot-notes. This data, such as rainfall, type of car used, temperature of car at time of despatch, date of despatch, &c., were uniform for each locality and grower, and their inclusion in the tables would have necessitated unnecessary repetition. It was therefore decided to include in the tables variable factors only, such as date and hour of picking, temperature and time of picking, kind of package, and number of wrappers used, to determine the influence which these might have upon the keeping qualities of the fruit.

Nos. 1 and 2 Tables show the general results of the examination; No. 3 Table indicates the influence of the different types of package (see illustration); No. 4 Table shows the effect of double wrapping, single wrapping, or absence of wrapping; No. 5 Table shows the points scored by each variety.

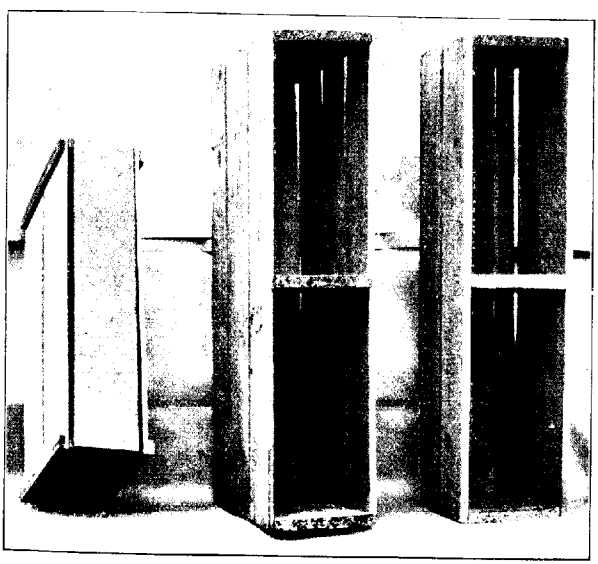
Regarding the above, it would appear that slightly better results were obtained through the use of nests of three trays than from the use

of any other type of package. The same remarks apply to the use of double wrappers as against the use of the single wrapper or the packing of the fruit unwrapped.



No. 1. No. 2. No. 3

No. 1.—Nest of Three Trays, Hoop-ironed.
No. 2.—Single Tray, showing Wood-wool Lining.
No. 3.—Westwood Patent Case, Showing Moveable Partitions.

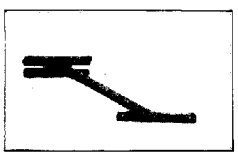


No. 1. No. 2. No. 3.

No. 1.—Type of Peach Tray used in America.
No. 2.—Australian "Flat" bushel Case.
No. 3.—Australian "Flat" half-bushel Case.

Results of the analyses of the following factors, viz., date of irrigation, annual rainfall, maturity of fruit, date and hour when picked, temperature at time of picking, atmospheric temperature at time of storage, pre-cooling, or non-pre-cooling, were even smaller than the results obtained in connexion with the types of packages, wrapping, or variety of fruit—in fact, were too small to justify publication.

In addition to the fruit included in the two main experiments, three of the Ardmona growers, viz., Messrs. D. Simpson, V. R. McNab, and H. Pickworth, forwarded a few cases of "Pullar's Cling" and "Nicholl's Orange Cling" varieties. The first lot, two cases of "Nicholl's Orange Cling," consigned by Mr. D. Simpson, were placed in cool storage two or three days after the fruit included in the main Ardmona experiment. These were removed at the same time as the other fruit, and on being tested were found to be in such excellent condition as to appearance, soundness, and flavour that the writer, who made an independent examination, awarded maximum points for appearance, soundness, and flavour. On 26th January, 1915, Mr. V. R. McNab forwarded six cases, consisting of four cases of "Pullar's Cling" and two cases of "Late Red"; and on 24th February, 1915, Mr. H. Pickworth sent two additional cases of "Pullar's Cling." The first of these cases was removed from the cool stores on 3rd March, and thereafter were taken out at weekly intervals, the last being removed on 17th March. The "Pullar's Cling" variety were in such good condition that I awarded them full points on such examination. Samples were retained at my office, and were found to retain their flavour and appearance for eight or ten days. The "Late Red" variety were good in appearance and soundness, but lacking in flavour. The results show that further experiments with the "Pullar Cling" variety are well worth a trial, as it appears to retain its keeping qualities and flavour better than any of the other varieties tested, not even excepting the "Crawford" variety.



Tool used to Hoop-iron Trays.

Summarized, it would seem that, with the exception of the variety of fruit used, none of the factors mentioned seem to have any important bearing on the result. All other varieties, excepting the "Crawford," "Nicholl's Orange Cling" and "Pullar's Cling," show a notable absence of flavour, irrespective of all the conditions under which the fruit was picked and packed.

The "Crawford" variety, especially in connexion with the Kyabram experiment, showed fair results, even after the fruit had been kept for seven or eight days after removal from the store.

The experiments generally show that the two varieties of clingstones, viz., "Pullar's Cling" and "Nicholl's Orange Cling," were far and away the best peaches of the tests for retaining their keeping qualities in cool storage; and, although the experiments might be continued in connexion with the "Crawford" variety, it would appear that the two clingstone varieties are the ones from which the best results may be hoped.

The results obtained in connexion with "Elberta" variety were in particular very disappointing, as the "Elberta" is one of the most

[Continued on page 54.]

TABLE NO. 1.—GENERAL ANALYSIS OF RESULTS OF JUDGING (ARDMONA).

Variety.	Grower.	Date of Last Irrigation.	Stage of Maturity of Fruit.	Date and Hour when Picked.	Temperature at Hour of Picking.	Description of Package.	Wrapped or Unwrapped.	Results of Examination. Points scored. (Total Possible Maximum, 250.) Appearance (Max. 75.)	Soundness (Max. 75.)	Flavour (Max. 100.)	Total.	Percentages of Points scored in Relation to Possible Maximum. Appearance.	Soundness.	Flavour.	Total.
					Fahr.							%	%	%	%
Crawford	H. Pickworth and Son ..	25.12.14	B	4 p.m., 11.1.15 ..	80 deg. ..	Nest three trays	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
,, ..	G. Wilson	8.1.15	B (1)	10 a.m., 12.1.15 ..	72 deg. ..	1-bushel cases ..	X	65	65	30	160	26	26	12	64
							Z	65	65	30	160	26	26	12	64
,, ..	P. Pullar and Nephew ..	3.1.15	C	7.30 a.m., 12.1.15	60 deg. ..	1-bushel cases ..	X	60	60	..	120	24	24	..	48
							Z	55	55	..	110	22	22	..	44
Elberta ..	A. Lennie	1.1.15	B (1)	5 p.m., 11.1.15 ..	80 deg. ..	Nest three trays	X	70	70	..	140	28	28	..	56
							Y	70	70	..	140	28	28	..	56
							Z	70	70	..	140	28	28	..	56
,, ..	H. Pickworth and Son ..	9.1.15	B	7.30 a.m. 12.1.15	60 deg. ..	Nest three trays	X	55	55	..	110	22	22	..	44
							X	55	55	..	110	22	22	..	44
,, ..	E. Bissick	No record	B	4 p.m., 11.1.15 ..	85 deg. ..	½-bushel cases ..	X	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
,, ..	E. Bissick	,,	B	8.30 a.m., 11.1.15	80 deg. ..	½-bushel cases	Z	65	65	..	130	26	26	..	52
,, ..	Young Bros.	,,	L	11.1.15 ..	80 deg. ..	1-bushel cases	Z	60	60	..	120	24	24	..	48
							Z	45	45	..	90	18	18	..	36
,, ..	Young Bros.	,,	B (1)	8 a.m., 12.1.15 ..	60 deg. ..	Nest three trays	Z	45	45	..	90	18	18	..	36
							X	60	60	..	120	24	24	..	48
							Y	60	60	..	120	24	24	..	48
							Z	60	60	..	120	24	24	..	48
Sea Eagle ..	F. Woods	No record	C	7.30 a.m., 12.1.15	60 deg. ..	Nest three trays	X	65	65	..	130	26	26	..	52
							Y	55	55	..	110	22	22	..	44
							Z	50	50	..	100	20	20	..	40
Reine de Verge	Turnbull Bros. ..	28.12.15	C (1)	7.30 a.m., 12.1.15	60 deg. ..	Nest three trays	X	75	75	..	150	30	30	..	60
							Y	75	75	..	150	30	30	..	60
							Z	75	75	..	150	30	30	..	60

TABLE NO. 1. GENERAL ANALYSIS OF RESULTS OF JUDGING (ARDMONA)—*continued.*

Variety.	Grower.	Date of Last Irrigation.	Stage of Maturity of Fruit.	Date and Hour when Picked.	Temperature at Hour of Picking.	Description of Package.	Wrapped or Unwrapped.	Results of Examination. Points scored. (Total Possible Maximum, 250.) Appearance (Max. 70.)	Soundness (Max. 75.)	Flavour (Max. 100.)	Total.	Percentages of Points scored in Relation to Possible Maximum. Appearance.	Soundness.	Flavour.	Total percentage.
					Fahr.										
Muir ..	D. Simpson and Sons ..	7.1.15	C	7.30 a.m., 12.1.15	60 deg. ..	Nest three trays	X	55	65	..	120	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
.. .. ..	D. Simpson and Sons ..	7.1.15	C	7.30 a.m., 12.1.15	60 deg. ..	Bushel cases	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
.. .. ..	P. Pullar and Nephew ..	3.1.15	C	5 p.m., 11.1.15 ..	60 deg. ..	Nest three trays	X	60	60	..	120	24	24	..	48
							Y	60	60	..	120	24	24	..	48
							Z	55	55	..	110	22	22	..	44
Kia Ora ..	C. Hornidge	1.1.15	C	7.30 a.m., 12.1.15	60 deg. ..	Westwood's patent cases, three partitions	X	65	65	..	130	26	26	..	52
							X	65	65	..	130	26	26	..	52
							X	65	65	..	130	26	26	..	52
.. ..	C. Hornidge	1.1.15	C	7.30 a.m., 12.1.15	60 deg. ..	½-bushel cases	Y	55	55	..	110	22	22	..	44
							Z	55	55	..	110	22	22	..	44
.. ..	H. V. McNab	24.12.14	C	7 a.m., 12.1.15 ..	60 deg. ..	Westwood's patent cases	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
.. ..	A. Henderson ..	10.1.15	C	12 noon, 12.1.15	75 deg. ..	Westwood's patent cases	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
Late Red (uncertain)	A. S. Henderson ..	8.1.15	C	Noon, 12.1.15 ..	75 deg. ..	Nest three trays	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	55	55	..	110	22	22	..	44
Late Red ..	A. Henderson ..	10.1.15	C	11 a.m., 12.1.15 ..	75 deg. ..	½-bushel cases	X	45	45	..	90	18	18	..	36
							Z	45	45	..	90	18	18	..	36

NOTE 1.—B (1) Means fruit which is full-grown and fully coloured, but firm.
B. Means fruit which is full-grown and fully coloured, but hard.
C (1) Means fruit which is full-grown, but quite fully coloured, and hard.
C. Means fruit which is not quite full-grown, nor fully coloured, and very hard.

NOTE 2.—Rainfall during preceding twelve months, 91 inches. Date of storage country cool-store, 5 p.m., 12.1.15. Atmospheric temperature time of storage, 75 deg. Fahr. Temperature of chamber, 30 deg. = 32 deg. Fahr. Date of despatch, 4.30 p.m., 13.1.15. Temperature of car at time of despatch, 50 deg. Fahr. Date of arrival at Government Cool Stores, 8 a.m., 14.1.15. Temperature of car on arrival at Government Cool Stores, 50 deg. Fahr.

NOTE 3.—X means wrapped in one paper, Y wrapped in two papers, Z unwrapped.

TABLE II. GENERAL ANALYSIS OF RESULTS OF JUDGING (KYABRAM AND LANCASTER).

Variety.	Grower.	Date of Last Irrigation.	Stage of Maturity of Fruit.	Date and Hour when Picked.	Temperature at Hour of Picking.	Description of Package.	Wrapped or Unwrapped.	Results of Examination.							
								Points scored. (Total Possible Maximum, 250.)				Percentages of Points scored in Relation to Possible Maximum.			
								Appearance (Max. 75.)	Soundness (Max. 75.)	Flavour (Max. 100.)	Total.	Appearance (Max. 75.)	Soundness (Max. 75.)	Flavour (Max. 100.)	Total.
					Fahr.							%	%	%	%
Late Red ..	E. J. Dowling ..	2.1.15	C	9 a.m., 14.1.15 ..	70 deg. ..	Nest of three trays	X	65	70	..	135	86	93	..	54
							Y	60	70	..	130	24	28	..	52
							Z	70	65	..	135	28	26	..	54
,, ..	Tuckfield Bros. ..	1.1.15	C	4 p.m., 13.1.15 ..	80 deg. ..	Nest of three trays	X	65	60	..	125	26	24	..	50
							Y	60	55	..	115	24	22	..	46
							Z	70	65	..	135	28	26	..	54
,, ..	W. Liston	20.12.14	C	7 p.m., 13.1.15 ..	70 deg. ..	Nest of three trays	X	65	65	..	130	26	26	..	52
							Y	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
,, ..	J. West	1.1.15	C	8 a.m., 14.1.15 ..	70 deg. ..	Westwood's patent case	X	70	70	..	140	28	28	..	56
							Y	70	70	..	140	28	28	..	56
							Z	70	70	..	140	28	28	..	56
,, ..	J. West	1.1.15	C	8 a.m., 14.1.15 ..	70 deg. ..	American tray	X	70	70	..	140	28	28	..	56
,, ..	L. G. Clarke ..	11.1.15	C	6.30 a.m., 14.1.15	65 deg. ..	Bushel case ..	Y	60	70	..	130	24	28	..	52
							Z	60	70	..	130	24	28	..	52
Elberta ..	L. G. Clarke ..	11.1.15	C	6.30 a.m., 14.1.15	65 deg. ..	½ bushel ..	X	55	65	..	120	22	26	..	48
							Y	55	70	..	125	22	28	..	50
					No record (presumably 70 deg.)	Westwood's patent case	X	60	60	..	120	24	24	..	48
,, ..	J. Anthony	7.1.15	C	8 a.m., 14.1.15 ..			Y	60	70	..	130	24	28	..	52
							Z	50	50	..	100	20	20	..	40
,, ..	A. G. Marchant ..	31.12.14	C	8 a.m., 14.1.15 ..	76 deg. ..	Bushel case ..	X	65	65	..	130	26	26	..	52
							Z	65	65	..	130	26	26	..	52
,, ..	J. Anthony	7.1.15	C	8 a.m., 14.1.15 ..	No record (presumably 70 deg.)	Nest of three trays	X	65	65	..	130	26	26	..	52
							Y	65	70	..	135	26	28	..	54
							Z	60	60	..	120	24	24	..	48
							X	50	60	..	110	20	24	..	44
,, ..	A. Eastwood	26.12.14	C	9 a.m., 13.1.15 ..	118 deg. (sun)	Westwood's patent case	Y	50	50	..	100	20	20	..	40
							Z	60	60	..	120	24	24	..	48
,, ..	F. C. King	No record	C	13.1.15 ..	No record	Bushel case ..	Y	55	65	..	120	22	26	..	48
							Z	55	65	..	120	22	26	..	48

TABLE II. GENERAL ANALYSIS OF RESULTS OF JUDGING (KYABRAM AND LANCASTER)—*continued.*

Variety.	Grower.	Date of Last Irrigation.	Stage of Maturity of Fruit.	Date and Hour when Picked.	Temperature at Hour of Picking.	Description of Package.	Wrapped or Unwrapped.	Results of Examination.							
								Points scored. (Total Possible Maximum, 250.)				Percentages of Points scored in Relation to Possible Maximum.			
								Appearance (Max. 75.)	Soundness (Max. 75).	Flavour (Max 100).	Total.	Appearance (Max. 75).	Soundness (Max. 75).	Flavour (Max. 100).	Total.
					Fahr.							%	%	%	%
Elberta ..	J. B. Sawyers ..	5.1.15	C	8.30 a.m., 13.1.15	75 deg. ..	Bushel case ..	X	60	70	..	130	24	28	..	52
							Y	60	70	..	130	24	28	..	52
,, ..	J. H. Lancaster ..	11.1.15	B	9 a.m., 14.1.15 ..	80 deg. ..	Nest of three trays	X	40	60	..	100	16	24	..	40
							Y	45	60	..	105	18	24	..	42
							Z	35	55	..	90	14	22	..	36
Muir ..	G. D. Steele	6.1.15	B	10 a.m., 13.1.15 ..	No record (presumably 85 deg.)	Bushel case ..	X	65	65	..	130	26	26	..	52
							Z	50	50	..	100	20	20	..	40
,, ..	J. West	11.1.15	C	8 a.m., 14.1.15 ..	70 deg. ..	Bushel case ..	X	55	60	..	115	22	24	..	46
							Z	55	70	..	125	22	28	..	50
Crawford ..	S. Young	9.1.15	C	7 a.m., 14.1.15 ..	70 deg. ..	Nest of three trays	X	70	70	80	220	28	28	32	88
							Y	70	70	80	220	28	28	32	88
							Z	60	60	80	200	24	24	32	80
,, ..	S. Young	9.1.15	C	7 a.m., 14.1.15 ..	70 deg. ..	½-bushel cases	X	65	70	40	175	26	28	16	70
							Z	65	65	40	170	26	26	16	68
,, ..	J. West ..	1.1.15	B (1)	8 a.m., 14.1.15 ..	70 deg. ..	Nest of three trays	X	65	70	40	175	26	28	16	70
							Y	65	60	40	165	26	24	16	66
							Z	70	70	40	180	28	28	16	72
,, ..	J. West	1.1.15	B (1)	8 a.m., 14.1.15 ..	70 deg. ..	½-bushel cases	X	70	70	30	170	28	28	12	68
							Z	70	70	30	170	28	28	12	68
Late Crawford	Tuckfield Bros. ..	1.1.15	B	4 p.m., 13.1.15 ..	80 deg. ..	Nest of three trays	X	60	65	45	170	24	26	18	68
							Y	70	65	45	180	28	26	18	72
							Z	60	55	45	160	24	22	18	64
Early Crawford	F. Cooper	7.1.15	B (1)	8 a.m., 14.1.15 ..	70 deg. ..	Nest of three trays	X	55	65	70	190	22	26	28	76
							Y	60	70	70	200	24	28	28	80
							Z	60	70	70	200	24	28	28	80

NOTE 1. —B (1) Means fruit which is full-grown, and fully coloured, but firm.
B Means fruit which is full-grown, and fully coloured, but hard.
C (1) Means fruit which is full-grown, not quite fully coloured, and hard.
C Means fruit which is not quite full-grown, nor fully coloured, and very hard.

NOTE 2. —Rainfall during preceding twelve months, 9¼ inches. Temperature of car at time of despatch, 53 deg. Fahr. Date and time of despatch, 4.20 p.m., 14.1.15. Date of arrival at Government Cool Stores, 2 p.m., 15.1.15. Temperature of car on arrival at Government Cool Stores, 60 deg. Fahr.

NOTE 3. —X means wrapped in one paper, Y wrapped in two papers, Z unwrapped.

TABLE III.—RELATIVE VALUE OF VARIOUS KINDS OF PACKAGES IN RELATION TO STORAGE AND TRANSPORTATION OF PEACHES.

Kind of Package.	Ardmona. Average of Points scored.					Kyabram and Lancaster. Average of Points scored.					Grand Average Totals.
	No. of Tests.	Appearance. (Possible Maximum, 75 Points).	Soundness. (Possible Maximum, 75 Points).	Flavour. (Possible Maximum, 75 Points).	Total. (Possible Maximum, 250 Points).	No. of Tests.	Appearance. (Possible Maximum, 75 Points).	Soundness. (Possible Maximum, 75 Points).	Flavour. (Possible Maximum, 75 Points).	Total. (Possible Maximum, 250 Points).	
Nests of three trays ..	27	62·59	62·96	2·22	127·40	27	61·48	64·29	31·29	157·06	142·23
Westwood's patent case ..	9	65·00	65·00	..	130·00	9	59·44	61·66	..	121·10	125·55
One-bushel case	8	58·12	58·12	7·50	123·74	10	58·50	64·50	..	123·00	123·37
Half-bushel case ..	8	56·87	56·87	..	113·74	6	63·33	67·50	23·33	154·16	133·95

TABLE IV.—ANALYSIS SHOWING EFFECT OF DOUBLE WRAPPING, SINGLE WRAPPING, AND UNWRAPPING FRUIT.

ARDMONA.

Variety.	X. Average of Points scored.					Y. Average of Points scored.					Z. Average of Points scored.				
	No. of Tests.	Appearance.	Soundness.	Flavor.	Total.	No. of Tests.	Appearance.	Soundness.	Flavor.	Total.	No. of Tests.	Appearance.	Soundness.	Flavor.	Total.
Elberta ..	7	60·71	60·71	..	121·42	3	63·33	63·33	..	126·66	5	57·00	57·00	..	114·00
Sea Eagle ..	1	65·00	65·00	..	130·00	1	55·00	55·00	..	110·00	1	50·00	50·00	..	100·00
Reine de Verge	1	75·00	75·00	..	150·00	1	75·00	75·00	..	150·00	1	75·00	75·00	..	150·00
Muir	3	60·00	63·33	..	123·33	2	62·50	65·00	..	127·50	3	61·66	61·66	..	123·32
Kia Ora ..	6	65·00	65·00	..	130·00	2	65·00	65·00	..	130·00	3	58·33	58·33	..	116·66
Late Red ..	2	55·00	55·00	..	110·00	1	65·00	65·00	..	130·00	1	33·33	33·33	..	66·66
Crawford ..	5	64·00	64·00	6·00	134·00	..	..	..	..	..	2	60·00	60·00	15·00	135·00
KYABRAM AND LANCASTER.															
Elberta ..	9	61·66	63·88	..	125·54	9	60·55	65·55	..	126·10	12	62·50	64·16	..	126·66
Muir	4	55·0	63·75	..	118·75	2	52·5	65·0	..	117·5	3	46·66	58·33	..	104·99
Crawford ..	6	64·16	68·33	50·83	183·32	4	66·25	66·25	58·75	191·25	6	64·16	65·0	50·83	179·99

NOTE. X means wrapped in one paper. Y means wrapped in two papers. Z means unwrapped.

TABLE V.—COMPARISON OF RESULTS FOR EACH VARIETY OF PEACH.

Variety.	Ardmona.					Kyabram and Lancaster.					Average Points Scored, Ardmona and Kyabram and Lancaster.
	Average Points Scored.					Average Points Scored.					
	No. of Tests.	Appearance. (Maximum, 75 Points).	Soundness. (Maximum, 75 Points).	Flavour. (Maximum, 100 Points).	Total. (Maximum, 250 Points).	No. of Tests.	Appearance. (Maximum, 75 Points).	Soundness. (Maximum, 75 Points).	Flavour. (Maximum, 100 Points).	Total. (Maximum, 250 Points).	
Elberta	15	60·00	60·00	..	120·00	30	61·66	61·66	..	123·32	121·66
Sea Eagle	3	56·66	56·66	..	113·32	..	..	..	..	..	113·32
Reine de Verge	3	75·00	75·00	..	150·00	..	..	..	..	..	150·00
Muir	8	61·25	62·50	..	123·75	9	51·66	62·22	..	113·88	118·81
Kia Ora	11	63·18	63·18	..	126·36	..	..	..	..	..	126·36
Late Red	5	55·00	55·00	..	110·00	..	..	..	..	..	110·00
Crawford	7	62·85	62·85	8·57	134·27	16	64·68	66·56	52·81	184·05	159·16

extensively planted varieties in the Goulburn Valley. It, however, showed an almost total absence of flavour. In future experiments, it would be advisable to experiment with fruit more matured than the fruit which was used in these tests. This should be tried in connexion with all varieties. If the flavour were allowed to fully develop, it is possible that this would be retained until removal of the fruit from cool store.

It must not be forgotten, however, that these experiments are only in their infancy, and that they may perhaps require to be conducted over a considerable period before any definite results can be arrived at.

Addenda.

In addition to the above-mentioned experiments, a series of tests, by direction of Mr. P. J. Carmody, Chief Orchard Supervisor, was conducted at Doncaster under supervision of Mr. A. A. Hammond, Orchard Supervisor for the Doncaster district. The fruit was carefully picked and packed, and was stored at the Government Cool Stores, Doncaster, at a temperature of 32 degrees Fahrenheit. Mr. Hammond has forwarded the following analyses of results:—

Variety.	Number of Fruits.	Date of Storage.	Date of Removal.	Results.
Catherine Ann ..	12	29.1.15	22.3.15	3 peaches sound; 9 peaches unsound; all lacking flavour
Late Crawford ..	5	29.1.15	23.3.15	All slightly gone in centre.
Early Late Crawford	5	29.1.15	22.3.15	All unsound.
Nellie	10	„	„	All gone round stone
Elberta	5	„	„	„ „ „
Belot's Late ..	5	16.1.15	„	All unsound.
Petty's Seedling ..	6	„	„	Mealy and unsound.
Royal George ..	6	„	„	All gone.
Crimson George ..	5	„	„	„ „
Burger's Seedling ..	6	„	„	„ „

Mr. Hammond further states:—"The above fruit was kindly presented by Mr. Hudson, of Doncaster. Some of each variety was naked, single wrapped, and double wrapped. The result in all instances was practically the same, viz., the exterior appearance of fruit was good, but, on being cut, all were found to be more or less decayed, and quite lacking flavour. It is worthy of note that some plums of the 'Pickering' variety were similarly experimented with, and came out in excellent condition."

Conclusion.

The tests so far show that, with the exception of the "Crawford" variety, little is to be hoped for in the way of successfully shipping any of the "Slipstone" peaches over long distances; but that the keeping qualities of the "Clingstone" varieties have been established. This is especially the case with the "Nicholl's Orange Cling." Many of the "Freestone" varieties, such as "Elberta," "Muir," &c., which have failed to retain their keeping qualities over the long periods covered in these

experiments should, notwithstanding, be tested for the Inter-State and New Zealand markets. Small consignments should be carefully picked, graded, and packed, pre-cooled, and shipped to New South Wales, Queensland, and New Zealand, in refrigerator accommodation. For such tests the fruit should be well on the ripe side, picked in the evening, cooled under an open shed over night, packed in the early morning, and placed in cool store immediately after packing. Ice car, or insulated car service, should be used to convey the fruit to Melbourne, and, on arrival, it should be placed in the cool chamber on board ship with the least possible delay. The charges involved in this method of transmission preclude the possibility of making a profit in connexion with small experimental shipments; but if the results justify, consignments on a commercial scale could be undertaken later on. If the third rail tests now being conducted on the Murray prove efficient to overcome the lamentable existing break of gauge on our Inter-State railways, the fruit could be forwarded by rail direct to markets in the other States when the third rail system becomes established. In future experiments the question of development of flavour and the period over which this flavour is retained should be carefully noted for each variety tested.

In conclusion, the writer wishes to thank all who have so materially and enthusiastically assisted in carrying out the experiments, and to express his confidence that their enthusiasm remains undiminished, despite the apparent failure of some of our most favoured varieties of peach to withstand the tests to which they were subjected.

VERNACULAR NAMES OF VICTORIAN PLANTS.

Communicated by Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Chairman, and C. S. Sutton, M.B., Ch.B., Secretary of the Plant Names Committee of the Victrrian Field Naturalists' Club.

Continued from page 493, *Vol. XIII.* (*10th August*, 1915).

Botanical Name.	Popular Name.	Use or Character.
SYMPETALEÆ PERIGYNÆ.		
OLACACEÆ.		
Olax—		
stricta, R.Br.	Olax	Of no known economic value.
SANTALACEÆ.		
Exocarpos—		
cupressiformis, Labil. ..	Cherry Ballart	Wood handsome and close grained. Used for turning and cabinet work.

VERNACULAR NAMES OF VICTORIAN PLANTS—*continued.*

Botanical Name.	Popular Name.	Use or Character.
SYMPETALEÆ PERIGYNÆ—*continued.*		
SANTALACEÆ—*continued.*		
Exocarpos—continued.		
spartea, R.Br.	Broom Ballart	Of no known economic value.
aphylla, R.Br.	Leafless Ballart	
stricta, R.Br.	Pale-fruited Ballart ..	
nana, Hook. f.	Alpine Ballart	
Omphacomeria—		
acerba, A.DC.	Leafless Sour bush ..	Of no known economic value.
Leptomeria—		
acida, R.Br.	Sour Currant-bush ..	The berries are edible, having a pleasant subacid flavour.
aphylla, R.Br.	Leafless Currant-bush ..	
Choretrum—		
glomeratum, R.Br. ..	Common Currant-bush ..	Of no known economic value.
spicatum, F.v.M. ..	Spiked Currant-bush ..	
lateriflorum, R.Br. ..	Dwarf Currant-bush ..	
Santalum—		
obtusifolium, R. Br. ..	Blunt-leaved Quandong ..	Timber is useful for cabinet work.
Fusanus—		
acuminatus, R.Br. ..	Sweet Quandong ..	The timber takes a fine polish and is excellent for cabinet work. The fruit of the Sweet Quandong is edible, and makes an excellent preserve.
persicarius, F.v.M. ..	Bitter Quandong ..	
Thesium—		
australe, R.Br.	Austral Thesium ..	Of no known economic value.
LORANTHACEÆ.		
Notothixos—		
incanus, Oliver	Yellow Mistletoe ..	Serious pests in forests. All are parasitic on the branches of trees, spreading rapidly over the trees and eventually destroying them.
Loranthus—		
celastroides, Sieber ..	Common Mistletoe ..	
Exocarpi, Behr. ..	Harlequin Mistletoe ..	
linophyllus, Lenzl. ..	Slender Mistletoe ..	
pendulus, Sieber ..	Hanging Mistletoe ..	
Quandang, Lindl. ..	Grey Mistletoe	
PROTEACEÆ.	.. .. ..	In the larger members of this group the timber is beautifully or unusually figured, and hence useful for cabinet work.
Isopogon—		
anemonifolius, R.Br. ..	Tall Cone-bush	Of no known economic value.
ceratophyllus, R.Br. ..	Horny Cone-bush ..	
Adenanthos—		
terminalis, R.Br. ..	Hair-bush	
Conospermum—		
Mitchellii, Meiss. ..	Mountain Conosperm ..	Worthy of garden culture, especially the first named
patens, Schlech... ..	Slender Conosperm ..	
taxifolium, Smith ..	Yew-leaved Conosperm ..	
Persoonia—		
arborea, F.v.M.	Tree Geebung	Wood tough and useful for fishing-rods.
salicina, Persoon. ..	Willow Geebung ..	Worthy of cultivation.
lanceolata, Andrews ..	Boxwood Geebung ..	Wood useful for tool handles.
confertiflora, Benth. ..	Close-flowered Geebung ..	Might possibly be improved by cultivation.
linearis, Andrews ..	Narrow-leaved Geebung ..	
revoluta, Sieber ..	Pale Geebung	
rigida, R.Br.	Hairy Geebung	All more or less worthy of cultivation. *P. rigida* has edible berries.
myrtilloides, Sieber ..	Myrtle Geebung	
oxycoccoides, Sieber ..	Heathy Geebung	
Chamaepeuce, Lhotsky ..	Dwarf Geebung	
juniperina, Labill. ..	Prickly Geebung	
Orites—		
lancifolia, F.v.M. ..	Alpine Orites	Might be worthy of garden culture.

VERNACULAR NAMES OF VICTORIAN PLANTS—*continued.*

Botanical Name.	Popular Name.	Use or Character.
SYMPETALEÆ PERIGYNÆ—*continued.*		
PROTEACEÆ—*continued.*		
Grevillea—		
pterosperma, F.v.M. ..	Desert Grevillea ..	Useful flowering shrubs or trees, of which G. sulpina, G. floribunda, G. Huegelii, G. lavandulacea, G. oleoides, G. rosmarinifolia, and G. Victoriæ, are especially worthy of cultivation.
Barklyana, F.v.M. ..	Large-leaved Grevillea ..	
repens, F.v.M. ..	Spreading Grevillea ..	
Aquifolium, Lindl. ..	Prickly Grevillea ..	
ilicifolia, R.Br. ..	Holly Grevillea ..	
floribunda, R.Br. ..	Golden Grevillea ..	
alpina, Lindl. ..	Mountain Grevillea ..	
Williamsonii, F.v.M. ..	Sierra Grevillea ..	
lanigera, Cunn. ..	Woolly Grevillea ..	
rosmarinifolia, Cunn. ..	Rosemary Grevillea ..	
lavandulacea, Schlecht. ..	Lavender Grevillea ..	
Huegelii, Meiss. ..	Comb Grevillea ..	
Miquelliana, F.v.M. ..	Oval-leaved Grevillea ..	
Victoriæ, F.v.M. ..	Royal Grevillea ..	
oleoides, Sieber ..	Olive Grevillea ..	
confertifolia, F.v.M. ..	Dense-leaved Grevillea ..	
parvillora, R.Br. ..	Small-flowered Grevillea ..	
australis, R.Br. ..	Alpine Grevillea ..	
triternata, R.Br. ..	Needle Grevillea ..	
ramosissima, Meiss. ..	Branched Grevillea ..	
Hakea—		
eriantha, R.Br. ..	Tree Hakea ..	All are worthy of cultivation in gardens and parks.
pugioniformis, Cav. ..	Dagger Hakea ..	
vittata, R.Br. ..	Striped Hakea ..	
rostrata, F.v.M. ..	Beaked Hakea ..	
rugosa, R.Br. ..	Wrinkled Hakea ..	
saligna, R.Br. ..	Willow Hakea ..	
nodosa, R.Br. ..	Yellow Hakea ..	
aculeata, R.Br. ..	Silky Hakea ..	Useful as a hedge plant.
leucoptera, R.Br. ..	Needle Hakea ..	Timber is coarse-grained and soft. Sometimes used for tobacco-pipes, veneers, &c.
microcarpa, R.Br. ..	Small-fruited Hakea ..	Worthy of cultivation.
dactyloides, Cav. ..	Finger Hakea ..	Timber hard, close-grained, and useful for cabinet work, but is usually only a shrub.
ulicina, R.Br. ..	Furze Hakea ..	Worthy of cultivation.
flexilis, F.v.M. ..	Flexile Hakea ..	
Lomatia—		
ilicifolia, R.Br. ..	Holly Lomatia ..	Worthy of garden culture.
Fraseri, R.Br. ..	Tree Lomatia ..	Handsome timber useful for cabinet work.
longifolia, R.Br. ..	Long-leaved Lomatia ..	Worthy of garden culture.
Telopea—		
oreades, F.v.M. ..	Victorian Waratah ..	Furnishes an ornamental wood, and is also worthy of garden culture.
Banksia—		
collina, R.Br. ..	Hill Banksia ..	Worthy of garden culture.
marginata, Cav. ..	Silver Banksia ..	This wood is porous, soft, spongy, and light, but when thoroughly seasoned it is used for in-door ornamental work.
integrifolia, L. ..	Coast Banksia ..	Timber takes a good polish, is beautifully grained and suitable for fancy work.
serrata, L. ..	Saw Banksia ..	Yields a purplish mahogany-coloured wood useful for making furniture.
ornata, F.v.M. ..	Desert Banksia ..	Worthy of garden culture.
RUBIACEÆ.		
Morinda—		
jasminoides, Cunn. ..	Jasmin Morinda ..	Wood yellow and prettily marked, but usually only a shrub.
Nertera—		
depressa, Banks ..	Cushion Nertera ..	Useful for cultivation as a pot plant.
reptans, F.v.M. ..	Dwarf Nertera ..	Of no known economic value.
Coprosma—		
repens, Hook. f. ..	Spreading Coprosma ..	The fruits are edible, but are too small to be of much value, and C. Billardieri makes a good hedge plant.
nitida, Hook. f. ..	Shining Coprosma ..	
Billardieri, Hook. f. ..	Prickly Coprosma ..	
hirtella, Labill. ..	Rough Coprosma ..	

VERNACULAR NAMES OF VICTORIAN PLANTS—*continued.*

Botanical Name.	Popular Name.	Use or Character.
SYMPETALEÆ PERIGYNÆ—*continued.*		
RUBIACEÆ—*continued.*		
Opercularia—		
scabrida, Schlecht.	Rough Stinkweed	Of no known economic value.
aspera, Gaertn.	Thin Stinkweed	
hispida, Spreng.	Hairy Stinkweed	
ovata, Hook. f.	Broad Stinkweed	
varia, Hook. f.	Variable Stinkweed	
Pomax—		
umbellata, Soland.	Pomax	Might be worthy of garden culture.
Asperula—		
Gunnii, Hook. f.	Mountain Woodruff	
scoparia, Hook. f.	Common Woodruff	
Galium—		
parisiense, L. var. australe, Ewart	Wall Bedstraw	Plants of slight pasture value.
umbrosum, Soland.	Mouri Bedstraw	
Gaudichaudi, D.C.	Rough Bedstraw	
australe, D.C.	Tangled Bedstraw	
geminifolium, F.v.M.	Twin-leaved Bedstraw	
CAPRIFOLIACEÆ.		
Sambucus—		
xanthocarpa, F.v.M.	Yellow Elderberry	Worthy of garden culture. The fruits are sweetish.
Gaudichaudiana, D.C.	White Elderberry	
PASSIFLORACEÆ.		
Passiflora—		
cinnabarina, Lindl.	Red Passionflower	A good climber. Worthy of garden cultivation.
CUCURBITACEÆ.		
Melothria—		
Muelleri, Benth.	Mallee Cucumber	Of no known economic value
Sicyos—		
angulata, L.	Star Cucumber	Of no known economic value.

(To be continued.)

A COLLAR to fit properly should come close to the sides of the neck, with just room to shove your fingers in between the neck and collar at the bottom. For a horse that has a very thick neck, and gets sore at the top of the shoulders, take a collar, and, after oiling it well to make the leather pliable, fit it on a block of wood that will spread it in the right shape, buckle up tight, and leave for a couple of days, when it will keep that shape.

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915-1916.

Commenced 15th April, 1915; concluding 14th April, 1916.

CONDUCTED AT THE BURNLEY SCHOOL OF HORTICULTURE.

Six Birds. Pen No.	Breeds.	Owner.	Totals. 15.4.15 to 14.11.15	Totals. 15.11.15 to 14.12.15	Totals. Eight months.	Position in Competition.
		LIGHT BREEDS.				
		WET MASH.				
38	White Leghorns ..	G. McDonnell	969	147	1,116	1
2	,, ..	E. A. Lawson	952	157	1,109	2
34	,, ..	H. McKenzie and Son ..	951	153	1,104	3
42	,, ..	W. M. Bayles	930	151	1,081	4
19	,, ..	L. G. Broadbent ..	938	136	1,074	5
8	,, ..	C. J. Jackson	916	143	1,059	6
21	,, ..	E. B. Harris	939	109	1,048	7
5	,, ..	J. J. West	916	119	1,035	8
7	,, ..	Marville Poultry Farm ..	891	140	1,031	9
9	,, ..	J. Schwabb	884	121	1,005	10
30	,, ..	A. E. Silbereisen	855	148	1,003	11
53	,, (5 birds)	W. G. Swift	922	75	997	12
23	,, ..	Fulham Park	833	154	987	13
6	,, ..	F. Doldissen	880	106	986	14
59	,, ..	W. G. Osburne	829	156	985	15
26	,, ..	A. Mowatt	864	118	982	16
39	,, ..	W. M. Sewell	856	126	982	
28	,, ..	R. Lethbridge	828	153	981	18
3	,, ..	J. H. Gill	834	147	981	
16	,, ..	N. Burston	848	129	977	20
4	,, ..	R. Hay	844	133	977	
50	,, ..	John Hood	825	144	969	22
44	,, ..	Mrs. F. M. Oliver ..	835	133	968	23
54	,, ..	W. G. Clingin	823	145	968	
11	,, ..	J. B. Brigden	830	137	967	25
13	,, ..	T. Hustler	820	147	967	
10	,, ..	A. E. Tuttleby	860	106	966	27
1	,, ..	Mrs. H. Stevenson ..	828	125	953	28
18	,, ..	D. Adams	815	136	951	29
32	,, ..	F. Hodges	827	116	943	30
49	,, (5 birds)	Bennett and Chapman ..	816	126	942	31
24	,, ..	Lysbeth Poultry Farm ..	810	130	940	32
25	,, (5 birds)	Giddy and Son	800	126	926	33
20	,, ..	R. W. Pope	772	145	917	34
60	,, ..	H. C. Brock	796	111	907	35
27	,, ..	J. A. Stahl	760	147	907	
33	,, (5 birds)	A. W. Hall	779	127	906	37
15	,, ..	H. N. H. Mirams ..	770	121	900	38
43	,, ..	H. I. Merrick	756	144	900	
58	,, ..	Thirkell and Smith ..	742	154	896	40
55	,, ..	W. N. O'Mullane ..	775	113	888	41
48	,, ..	C. J. Beatty	761	126	887	42
36	,, ..	Weldon Poultry Yards ..	729	152	881	43
47	,, ..	J. C. Armstrong ..	756	121	877	44
22	,, ..	S. Buscumb	729	139	868	45
12	,, ..	G. Hayman	732	124	856	46
41	,, ..	J. A. Donaldson ..	721	129	850	47
46	,, ..	R. Berry	711	117	828	48
52	,, ..	A. A. Sandland	708	117	825	49
45	,, ..	South Yan Yean Poultry Farm	713	110	823	50
40	,, ..	C. C. Dunn	691	126	817	51
57	,, ..	B. Mitchell	707	97	804	52
37	,, ..	A. Ross	653	123	776	53
14	,, ..	W. Flood	632	124	756	54
31	,, ..	L. McLean	584	134	718	55
56	,, (5 birds)	C. Hurst	593	101	694	56
		Total	**45,147**	**7,294**	**52,441**	

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915-16—*continued.*

Pen No.	Breeds.	Owner.	Totals. 15.4.15 to 14.11.15	15.11.15 to 14.12.15	Eight months.	Position in Competition.
		LIGHT BREEDS.				
		DRY MASH.				
80	White Leghorns ..	W. H. Robbins	1,013	138	1,151	1
68	,, ..	H. McKenzie and Son ..	900	156	1,056	2
79	,, ..	Lysbeth Poultry Farm ..	845	137	982	3
64	,, ..	W. M. Bayles	839	127	966	4
63	,, ..	A. H. Padman	814	152	966	5
69	,, ..	E. MacBrown	837	128	965	6
76	,, ..	A. A. Sandland	813	149	962	7
62	,, ..	Benwerren Egg Farm ..	789	155	944	8
66	,, ..	E. A. Lawson	815	109	924	9
78	,, ..	H. Hanbury	811	108	919	10
72	,, ..	Mrs. E. Zimmermann ..	790	123	913	11
61	,, ..	Mrs. H. Stevenson ..	784	127	911	12
65	,, ..	Thirkell and Smith ..	770	136	906	13
67	,, ..	C. C. Dunn	746	147	893	14
71	,, ..	Moritz Bros.	745	143	888	15
73	,, ..	C. L. Lindren	671	108	779	16
77	,, ..	South Yan Yean Poultry Farm	653	125	778	17
74	,, ..	J. H. Gill	587	98	685	18
75	,, (5 birds)	Fulham Park	564	113	677	19
		Total	14,786	2,479	17,265	
		HEAVY BREEDS.				
		WET MASH.				
86	Black Orpingtons ..	C. E. Graham	941	136	1,077	1
97	,, ..	Marville Poultry Farm ..	919	114	1,033	2
100	,, (5 birds)	J. H. Wright	869	111	980	3
85	,, ..	H. H. Pump	846	122	968	4
81	,, ..	Mrs. T. W. Pearce ..	876	86	962	5
89	Rhode Island Reds	E. W. Hippe	832	121	953	6
93	Black Orpingtons ..	L. W. Parker	822	121	943	7
88	,, ..	J. McAllan	817	101	918	8
92	,, ..	J. Ogden	767	150	917	9
91	,, ..	A. Greenhalgh	773	118	891	10
99	,, ..	L. McLean	764	116	880	11
90	,, (5 birds)	Oaklands Poultry Farm ..	787	91	878	12
87	,, ..	W. C. Spencer	779	82	861	13
84	,, ..	Cowan Bros.	749	103	852	14
94	,, (5 birds)	D. Fisher	741	64	805	15
95	Silver Wyandottes ..	W. H. Forsyth	689	86	775	16
98	Faverolles ..	K. Courtenay	642	126	768	17
83	Black Orpingtons ..	G. Mayberry	620	99	719	18
96	White Orpingtons ..	Stranks Bros.	546	26	572	19
82	White Wyandottes	J. B. Brigden	460	94	554	20
		Total	15,230	2,077	17,307	

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ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Principal, School of Horticulture, Burnley.

The Orchard.

CULTIVATION.

The necessity for constant surface cultivation is apparent every summer, but more so in dry seasons. Not only in non-irrigable districts is this a necessity, but also in those districts where the trees can be watered, and more so in the latter case. In irrigated orchards the tendency of the soil, as a result of artificial waterings, is to set and harden. Consequently, stirring the surface must be resorted to, in order to keep up a good mechanical condition of the soil, and also to prevent loss of irrigation water by evaporation.

In non-irrigable orchards the cultivation is necessary to conserve what water has entered the sub-soil, as a result of the winter and spring rains. The soil crust should not be allowed to form. Summer showers are not alone the cause of these formations; dry weather conditions cause the soil to consolidate, and any tramping or vehicular traffic tends to harden the surface, and thus to allow the escape of moisture the trees most need.

SPRAYING.

Spraying for codlin moth will require to be very thorough. A spraying should be given during the second week in January, and another in a month's time. All infected fruit should be picked from the trees, or gathered from the ground, and destroyed by boiling. It is often a common practice to place the infected fruit in heaps, and attempt to destroy the larvæ by building a fire on top of the fruit. This method cannot be too strongly condemned, as it is almost inevitable that a number of the larvæ will escape. The only way to properly deal with such fruit by burning is to have it burnt in a furnace; failing this, boiling is the surest method of extermination when the larvæ are in the fruit. The caterpillars and chrysalids should be searched out of their hiding places under the bark, in the crevices of the tree, &c. All bandages should be well cleaned, and no chance whatever given to the insects to develop into the second brood.

Owing to the cool weather experienced during the season, woolly aphis is becoming prevalent, particularly in sheltered situations. It is advisable to free the trees as much as possible of this pest now, as, if left until the winter, it will destroy a large number of buds on the trees. A strong tobacco solution, any lime spray, resin wash, or kerosene emulsion will easily kill the insect.

FUMIGATION.

Citrus and other evergreen trees that are attacked by scale insects should be freed from the scale at this time. Although spraying with such mixtures as resin compound, crude petroleum emulsion, sulphur, lime and salt emulsion will do good work in keeping the scale insects in check, the only effective means of complete eradication is by fumigation. The trees are enclosed in a tent which will prevent the escape of any

gas through its texture. This gas is generated inside the tent, and the tent is kept over the tree for a period of from half to three-quarters of an hour. The best remedy is hydrocyanic gas, which is generated by placing cyanide of potassium in a mixture of sulphuric acid and water. Both the cyanide and the gas are deadly poison, and every care should be exercised in using them.

SUMMER PRUNING.

Summer pruning should now be carried out, and care should be taken that as much of the leafage as possible is retained on the trees. Unduly long laterals of fruiting trees may be shortened back, always cutting to a leaf. Unnecessary terminal leader growths, of which there are sometimes three or four, all strong growing, may be reduced to one, retaining this one as a leader. In no case should this growth be cut or interfered with in any way.

The results of these cuts will be to divert the sap, which was flowing into growths that would subsequently be pruned, into more profitable channels, so that weak buds and growths may be strengthened and induced into fruit bearing.

The Vegetable Garden.

The work in this section is much the same as in the flower garden. Frequent waterings, good mulching, and regular soil stirring will be the work for the month. As soon as any bed is cleared of vegetables, it should be manured and well dug over in preparation for the next crop. Deep digging is always desirable in vegetable growing. If any pests such as aphis, caterpillars, or tomato weevil have been present, it would be advisable to burn all the crop refuse, to destroy any insects that remain, and to give the plot a good dressing of gypsum or Clift's Manurial Insecticide.

Keep the tomatoes well watered and manured, pinching out surplus and strong growing laterals. In early districts the onion crop will be ripening. In late districts, or with late crops, the ripening may be hastened by breaking down the top. An autumn crop of potatoes may be planted. Cabbage, cauliflower, lettuce, and celery plants may be planted out.

The Flower Garden.

January should be a busy month in the garden. The waterings will be constant and frequent, and after every watering the surface should be well loosened and stirred with the hoe, to keep it moist and cool. More cultivation and less water is a good rule to be observed. If the hoe be used more and the hose less in summer, greater benefits will accrue, and the water bill will be considerably reduced. Mulchings with straw, grass, &c., are very useful just now. The mowings from lawns form valuable mulching; waste tobacco stems are also good as a mulch.

Dahlias, chrysanthemums, and other tall growing slender herbaceous plants will require support in the way of stakes, they will also need mulching considerably. These plants should receive no check

whatever, but should be continued with a regular, even growth right through the season. Another desideratum is that the soil should be well drained. Plants of all descriptions thrive far better in well-drained soils, and they require a far less amount of water.

Dahlias should be kept growing with only a minimum supply of water, and also with a spare amount of feeding. It is not wise to water them too freely until the end of February. The plants should make a slow, thrifty growth till that time, encouraged by constant cultivation with the hoe, rather than with watering. Afterwards, watering, feeding, and the encouragement of surface rooting may proceed.

A sharp look-out should be kept on these plants for attacks of red spider. If this insect appears, a good spraying with tobacco solution or benzole emulsion should be given to the plants.

Constant watch will need to be kept for the various small caterpillars that attack the buds of these plants. Spraying with a weak solution of Paris green and lime, or similar insecticide, will be useful; hand-picking should also be resorted to.

FOXES KILLING YOUNG LAMBS.

It occasionally occurs that a very simple contrivance may be used to effectually combat a serious difficulty; but its very simplicity is apt to give rise to scepticism in the minds of many who should be only too glad to avail themselves of its use, and through this its value may remain untested. Instances of this have occurred in connexion with the idea of using bells on lambing ewes to scare foxes. It is fully fifteen years since this was first mentioned in the agricultural notes of the Melbourne weekly press, yet it is so simple a device that its effectiveness is questioned, and consequently it is seldom tried or spoken of. It is, however, a fact that if ordinary bullock bells, costing about 1s. each, are strapped on the necks of two or three ewes per 100 in the lambing flock, there will be no trouble with foxes killing the lambs. The bell should be put on close up to lambing date, and taken off again after the lambs have recovered from the marking, and are fairly strong and active, for to leave the bells on throughout the year is likely to result in the foxes becoming accustomed to the noise.

So little publicity has been given to this simple method of protecting the lambs, that it is still unheard of in many quarters even to date. In the lambing season, 1914, the foxes were causing considerable losses on the Mount Cotterill Estate, Rockbank; but on hearing my experience with bells, Mr. Charles Holden at once put them into use, with the result that the lamb killing stopped, and they have been used there effectively again this year. Mr. Holden states that through his experience several other sheep-owners have tried the device this year, and they, also, have proved its efficacy.

REMINDERS FOR FEBRUARY.

Live Stock.

HORSES: *At grass.*—Supplement dry grass, if possible, with some greenstuff. Provide plenty of pure water and shade shelter. *In stable.*—Supplement hard feed with some greenstuff, carrots, or the like, and give a bran mash once a week at least. Avoid over-stimulating foods, such as maize and barley. Give hard

feed in quantities only consistent with work to be performed. Stable should be well ventilated, and kept clean. When at work, give water at short intervals. Always water before feeding.

CATTLE.—Provide succulent feed and plenty of clean water easy of access; also shade and salt lick in trough. Have each cow's milk weighed and tested for butter fat regularly. Rear heifer calves from those that show profitable results. Give milk at blood heat to calves. Keep utensils clean or diarrhœa will result. Do not give too much at a meal for the same reason. Give half-a-cup of limewater per calf per day in the milk. Let them have a good grass run or lucerne, or half-a-pound of crushed oats in a trough. Dehorn all dairy calves except those required for stud or show purposes.

PIGS.—Sows about to farrow should be supplied with short bedding in well-ventilated styes. All pigs should be provided with shade and water to wallow in. There will be plenty of cheap feed available now. Oats are quoted at 2s., and barley at 2s. 4d. per bushel, which is far cheaper than pollard at £7 per ton. Refer to articles on breeding, feeding, &c., in *Journals* for April 1912, June 1913, May 1915. Pigs should be highly profitable animals to feed now.

SHEEP.—Longwool crossbred ewes, known as "three-quarter breds" or "second cross", usually not in season until now, are this year earlier than usual. Downs rams can be joined for export lambs. Merino rams for wool growers, breeding ewes, and grazing sheep, or other white-faced longer-woolled breeds for export lambs if the season be favorable, or for holding over if the reverse. Should there be among the rams to be used any distinctly inferior to the others, keep them back for twenty-one days, give the best rams the first three weeks, but be sure the ewes are in season. Narrow, inferior-framed rams are almost invariably active, rapid workers compared to sheep of more substance. Keep salt available. Drench any weaners scouring. If necessary to feed, do not wait until in-lamb ewes are weak before commencing. When on continuous dry feed, sheep move directly off camp to water towards evening each day before feeding. When water becomes inferior, or available to in-lamb ewes irregularly, losses with both ewes and lambs before and after lambing appears to be more prevalent.

Avoid moving good-woolled sheep in heat and dust.

POULTRY.—Chickens should now be trained to perch: they will be more healthy and less liable to develop wry tails.

Provide plenty of green feed and give less grain and meat. Avoid condiments. Keep water in cool shady spot and renew three times each day. Keep dust bath damp.

Birds showing symptoms of leg weakness should be given 1 grain of quinine per day (three months old chickens, ½ grain) and plenty of skim milk.

Cultivation.

FARM.—See that haystacks are weatherproof. Cultivate stubble and fallow, and prepare land for winter fodder crops. Get tobacco sheds ready for crop. In districts where February rains are good, sow rye, barley, vetches, and oats for early winter feed.

ORCHARD.—Spray for codlin moth. Search out and destroy all larvæ. Cultivate the surface where necessary and irrigate where necessary, paying particular attention to young trees. Fumigate evergreen trees for scale. Continue budding.

FLOWER GARDEN.—Cultivate the surface and water thoroughly during hot weather. Summer-prune roses by thinning out the weak wood and cutting back lightly the strong shoots. Thin out and disbud dahlias and chrysanthemums. Layer carnations. Plant a few bulbs for early blooms. Sow seeds of perennial and hardy annual plants.

VEGETABLE GARDEN.—Continue to plant out seedlings from the seedbeds. Sow seeds of cabbage, lettuce, cauliflower, peas, turnip, and French beans. Keep all vacant plots well dug.

VINEYARD.—February is the best month for the "Yema" or Summer bud graft. Select scion-bearing vines; mark with oil paint those conspicuous for quality and quantity of fruit, regular setting and even maturity.

Sulphur again, if necessary, but avoid applying sulphur to wine grapes too short a time before gathering.

Cellars.—Prepare all plant and casks for the coming vintage. An ounce of bisulphite of potash, or a couple of fluid ounces of bisulphite of soda solution, to each bucket of water used to swell press platforms, tubs, &c., will help to keep it sweet. Keep cellars as cool as possible. Complete all manipulations so as to avoid handling older wines during vintage.